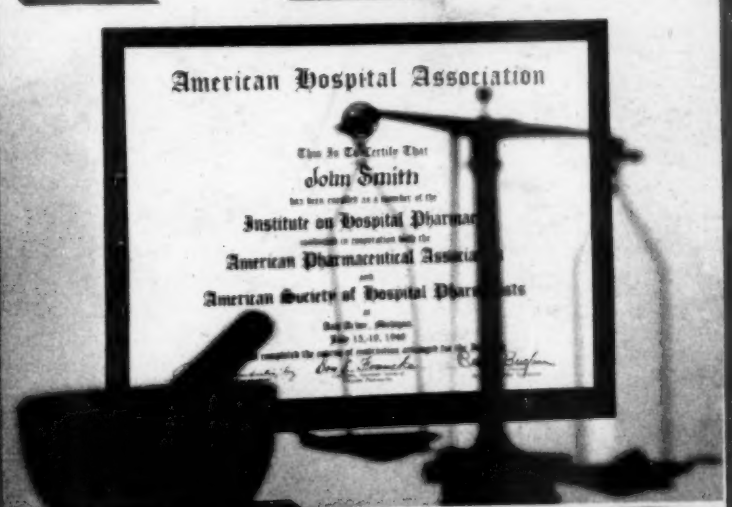
JULY-AUGUST 1946

THE BULLETIN OF THE



AMERICAN SOCIETY OF HOSPITAL PHARMACISTS

American Society of Hospital Pharmacists

Affiliated With The

American Pharmaceutical Association

CONSTITUTION

Article I.—NAME. The name of this organization shall be The American Society of Hospital Pharmacists.

Article II.—OBJECTIVES. The objectives of the Society shall be to improve and extend the usefulness of the hospital pharmacist to the institution he serves, to the members of the other health professions with whom he is associated, and to the profession of pharmacy by:

FIRST—Establishing minimum standards of pharmaceutical service in hospitals, in order to provide benefits and protection for the public health which it will receive by the skill and art of qualified hospital pharmacists; and to insure for the future an adequate supply of such qualified hospital pharmacists by providing a standardized hospital training for four-year pharmacy graduates who have elected a specialized hospital pharmacy course.

SECOND — Providing for interchange of information among pharmacists by encouraging initiative in the development of new pharmaceutical techniques, and by maintaining a close pharmaceutical contact between hospital pharmacists and those engaged in general pharmaceutical practice.

THIRD—Aiding the medical profession in extending the economic and rational use of medicaments.

Article III.—MEMBERSHIP

Section 1.*(a)—ACTIVE MEMBERS of this Society shall be registered pharmacists in good professional standing, who are members of the American Pharmaceutical Association and whose practice has been essentially connected with hospitals, clinics and dispensaries for a period of one year.

(b) HONORARY MEMBERS may be elected from among the individuals who are especially interested in hospital practice. Honorary members shall not pay dues, nor shall they be eligible to vote or to hold office.

(c) ASSOCIATE MEMBERS may be elected from among individuals other than hospital pharmacists, who, by their work in the health services, the teaching of prospective hospital pharmacists, or otherwise contributing to hospital pharmacy, make themselves eligible to membership. Associate members shall not be entitled to hold office or to vote. Associate members should be members of the American Pharmaceutical Association.

Section 2.—Applications for membership shall be received by the Committee on Membership and shall be acted upon by the Executive Committee on the recommendation of said Committee on Membership.

Article IV.—OFFICERS. The officers of this Society shall be a Chairman, a Vice-chairman, a Secretary, and a Treasurer, all of whom shall be elected annually, and none of whom, with the exception of the Secretary and Treasurer, may hold office for more than two consecutive terms.

Article V.—AMENDMENTS. Every proposition to alter or amend this Constitution shall be made by two members at an annual meeting of the Society and shall be voted upon by ballot of the members of the Society by mail at least one month subsequent to the annual meeting. All ballots to be eligible for voting must be post-marked within thirty (30) days of the date of the ballot.

BY - LAWS

Chapter I.—ELECTION OF OFFICERS. At the first session of each annual meeting of this Society, the Chairman shall appoint a committee of three members who shall submit nominations for each office of the Society for the ensuing year. The Committee shall present its nominations at the final session of the annual meeting at which time additional nominations may be made from the floor. They shall be voted upon by ballot of the members of the Society by mail at least one month subsequent to the annual meeting. All ballots to be eligible for voting must be post-marked within thirty (30) days of the date of the ballot. A majority of such votes cast shall constitute election.

Chapter II.—DUTIES OF OFFICERS:

Article 1.—CHAIRMAN and VICE-CHAIRMAN. The Chairman, or in his absence, the Vice-chairman, shall preside at all meetings. He will appoint all committees not otherwise provided for and shall be ex-officio member of all committees. He shall prepare a Chairman's address to be presented at the first session of the annual meeting of the Society following his installation.

Article 2.—SECRETARY. The Secretary shall keep minutes of the sessions of the Society and maintain a roll of its members. He shall notify individuals of their appointment to committees, notify members of the time and place of all meetings, and conduct the correspondence of the Society. He shall present a written report of his work to the annual meeting of the Society. He shall collect the dues of the members.

Article 3.—TREASURER. The Treasurer shall receive and keep account of all moneys received by the Society in the form of dues or remittances and shall disburse them at the direction of the Executive Committee or at the direction of the Finance Committee.

Chapter III.—EXECUTIVE COMMITTEE. The Executive Committee shall consist of the Officers of the Society and the Chairman of each standing committee. It shall meet on the call of the Chairman of the Society, shall have supervision over the expenditure of all funds of the Society, and shall be empowered to act for the Society during the period between annual meetings.

Chapter IV.—FINANCES. The membership dues of this Society shall be three dollars ($3.00) per year, payable January first of each year. Accepted regional groups consisting of twenty (20) or more members, or local groups consisting of ten (10) or more members shall collect dues for the American Society of Hospital Pharmacists. These groups may apply to the Executive Committee for refund in the amount of one dollar ($1.00) per year for each active or associate member. Refunds shall be paid within sixty (60) days after payment to the American Society of Hospital Pharmacists. This amendment is retroactive to January first, 1944.

Chapter V.—STANDING COMMITTEES. There shall be five standing committees of the Society; each consisting of three members appointed by the Chairman of the Society, with the approval of the Executive Committee.

Continued inside back cover.

THE BULLETIN
OF THE
AMERICAN SOCIETY of HOSPITAL PHARMACISTS

Volume 3 - July - August, 1946 - No. 4

THE BULLETIN is published bimonthly by the American Society of Hospital Pharmacists, a national organization devoted to the profession of hospital pharmacy, dedicated to the interests of the hospital pharmacist, and pledged to co-operate with the American Pharmaceutical Association with which it is affiliated.

Contributions of articles by hospital pharmacists, or by others interested in the progress of this important branch of the public health profession, will be accepted if they are of general interest to the hospital pharmacist. The editors reserve the right to revise all material submitted, if necessary.

Manuscripts submitted for publication should be typewritten in double spacing on one side of paper 8 1/2 x 11". Whenever possible a photograph, drawing, or printed form to illustrate the topic that is discussed in the article should be included.

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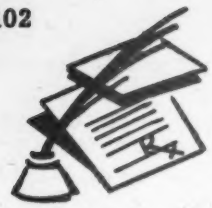

Correspondence

Sirs: After our liberation by the gallant armies of our Allies we are feeling very thankful toward the American people, not only for being liberated but also for the Help-Holland-Action, which has sent us such a lot of things, that we needed most urgently.

By all this we are even more interested in America than before this war. I am especially interested in the scientific and pharmaceutical activities in your country. So I am reading with great interest the Practical Pharmacy edition and Scientific Edition of the American Pharmaceutical Association.

I read about the activities of your Society and of your plans for the edition of a series of papers on various phases of the hospital pharmacy. As chief pharmacist of the hospitals of the Hague (the pharmaceutical service of these hospitals is centralized in the Municipal Pharmacy of the town) I should highly appreciate if you could send me these and all other publications of your honorable Society.

If it would be possible for me to join your Society as a foreign member I would appreciate this even more and should be glad to hear the terms.

I send you enclosed a reprint of description of the new Municiapl Pharmacy of the Hague, as published in 1939 in the "Pharmaceutisch Weekblad."

J. G. Kok, Director

The Municipal Pharmacy for
the Hospitals of The Hague.

Sirs: On behalf of the Chicago group and myself I wish to thank you and your associates and faculty for the excellent Institute on Hospital Pharmacy which you have presented.

The Institute was thoroughly enjoyed by all attending and I am sure it proved to be a worthwhile project.

Florence M. Hatter, Pres.
Hospital Pharmacists of Chicagoland

Sirs: I'd like to take this occasion to tell you how much our group appreciates the time and thought and effort you expended in putting on the Institute. If everyone took home as much practical information and spirit to conquer difficulties - you have indeed given hospital pharmacy another boost.

Wilma K. Maus

Mercy Hospital
Council Bluffs, Iowa

Sirs: I wish to take this opportunity to congratulate you on the wonderful job you are doing on THE BULLETIN. I look forward to each edition and read it from cover to cover.

The articles on Streptomycin, Benadryl, Tridione, Folic Acid and many others keep us pharmacists posted on the latest in Pharmacy.

Ervin C. Wells

Veterans Administration
Legion, Texas

Sirs: Just a little note to tell you I am still enthusiastic about my trip to Ann Arbor. Everything was so nicely planned for us Sisters and I assure you that all of us more than appreciated your efforts. This arrangement made it possible for us to attend the evening panel, and it was really very important for we were able to profit by the questions and answers.

Sister Jeanne Marie

St. Elizabeth Hospital
Youngstown, Ohio

Sirs: I wanted to let you know how much I appreciated the effort you and all the committee of the Institute put forth to make it a success. I know how much extra work had to be done and am sure I am expressing the thoughts of everyone there when I say that the Institute was a complete success.

Neal Johnston

Children's Hospital
Columbus, Ohio

Sirs: I should like to express my sincere appreciation for the fine Institute which you and your staff arranged for us at Ann Arbor. It was very interesting and informative as well as enjoyable.

I heartily thank you for the time and thought you so generously gave to make this new venture in hospital pharmacy a success.

Sister M. Stephanina

St. James Hospital
Chicago Heights, Illinois

Sirs: Please find enclosed check for five dollars ($5.00) to apply on my subscription to THE BULLETIN published by the American Society of Hospital Pharmacists. I want to take this opportunity to tell you how much I enjoy THE BULLETIN and of the many helps I get from it.

Sister M. Loyola

St. John's Hospital
Joplin, Missouri

Sirs: Enclosed please find check and application for membership in The American Society of Hospital Pharmacists. In as much as I am already a member of The American Pharmaceutical Association I have not included the check for five dollars.

It has been my privilege to read several of your hospital magazines and I consider it the most up-to-date and valuable publication available to the pharmacist.

L. B. Longaker

L. B. Longaker, Inc.
Apothecary
Philadelphia 4, Pa.

EDITORx·AL

INSTITUTE ON HOSPITAL PHARMACY

In writing the account of the Institute we feel that we have failed to bring you the spirit of enthusiasm that characterized the first Institute on Hospital Pharmacy. In addition to the outstanding presentations by the faculty, there were so many seemingly little things that contributed greatly in making the Institute a superior event.

Numerous elements helped to accomplish this — the appreciation of the Sisters of the housing arrangements which made it possible for them to participate in the panel discussions . . . . Austin Smith, one of the busiest men in the A.M.A., remaining through our entire Wednesday program and participating so enthusiastically in our panel discussion until almost midnight — when he could have left with perfect justification much earlier . . . . Robert Fischelis who caught the contagious bug of enthusiasm during the first day and rearranged his schedule at the important International Health Conference so he could remain another day and lead the panel discussion . . . . The enthusiasm of A.H.A.'s Hugo Hullerman, to whom institutes are nothing new, and his statement that this was one of the best programs he had ever attended . . . . The splendid audience participation in all discussions which not only showed great interest, but also that here was a group well informed — in fact we were often reminded during the course of the program that several sets of competent faculty could be selected from among those enrolled . . . . The pause that refreshes with cokes or iced tea which gave a welcome few minutes relaxation each midafternoon . . . . The great concern shown by those present that the Institutes on Hospital Pharmacy be continued, the offer by several representatives of local groups to arrange an Institute in their locality for next year, the many who wanted a definite commitment that there would be another institute in Ann Arbor soon . . . . The public address system whereby everyone could hear without effort every word spoken .... . The recording of the talks and panel discussions which somehow added a sense of permanency to the meetings — without in any way breaking the informality . . . . The realization by so many that others cannot do things for them, but can only give them an opportunity to acquire the knowledge to do for themselves . . . . The twenty-some hospital pharmacists who joined both the A.Ph.A. and the A.S.H.P., convinced that both organizations have a great deal to offer . . . . The members of the Department making the three hundred sandwiches and doing a multitude of other tasks . . . . Hans Hansen and Gloria Niemeyer awarding the certificates and the sense of pride and honor those receiving them showed . . . . The many letters of appreciation received from those who attended . . . . in themselves all little things but they and many others were blended into the total effect.

There is no need to editorialize on the need and value of Institutes on Hospital Pharmacy. The conviction and determination of those who attended the first will insure their perpetuation.

TETRAETHYL AMMONIUM ION

THE USE OF TETRAETHYL AMMONIUM IN PRODUCING A BLOCKADE OF THE AUTONOMIC GANGLIA

A Review of Preliminary Observations

K. N. Campbell, M.D., R. H. Lyons, M.D., G. K. Moe, M.D., S. W. Hoobler, M.D., R. B. Neligh, M.D., R. L. Berry, M.D. and M. L. Sutler, M.D.

The tetraethyl ammonium ion,* when injected into animals or man, has been found to produce an effective temporary blockade of the autonomic nervous system.[1,2,3,4] This report briefly describes the effects of such autonomic paralysis as studied in a large group of patients suffering from hypertension, Buerger's disease, peripheral arterio sclerosis, causalgia, and allied states.

PHARMACOLOGY

Burn and Dale[5] and Hunt[6] suggested that tetraethylammonium possessed a "paralyzing nicotinic action." Recently Acheson and Moe[1,3] have demonstrated by an extensive series of experiments that this ion prevents transmission of nerve impulses at the autonomic ganglia.

CLINICAL OBSERVATIONS

Clinically, the drug has been utilized for study of those diseases wherein a high degree of sympathetic nervous system tone may exist i.e., essential hypertension, functional and organic vascular diseases such as Raynaud's, livedo reticularis, acrocyanosis, thrombo-angiitis obliterans (Buerger's), peripheral arterio sclerosis, causalgia, reflex sympathetic dystrophy, and thrombophlebitis.[7]

The drug has been utilized in a 10 per cent solution which is chemically stable and readily soluble. A transient but apparently maximal effect (block of the autonomic ganglia) may be produced by as little as 0.1 gram. In general, to avoid equivocal results, 0.2 - 0.5 gram has been used as the maximal intravenous dose. For intramuscular injection, 20 mg./kg. or 1.0 - 1.2 grams has proven effective. The effects of the intramuscular dose are demonstrable for 6 to 8 hours. Following intravenous injection, with the patient in a recumbent position, the patient experiences a metallic taste (15 - 20 seconds) followed by tingling in the extremities (25 - 35 seconds). Thereafter, incomplete dilatation of the pupil, loss of accommodation, and fall in systolic and diastolic blood pressure ensue (30 - 90 seconds). The pulse rate increases and sweating, if present, stops. Peripheral skin temperature increases. The vasoconstrictor gradient in the extremities tends to be abolished. The blood pressure remains depressed for a few minutes and then assumes the initial level. Postural hypotension persists for as long as 60 minutes.

Preliminary studies indicate that tetraethyl ammonium ion is excreted almost quantitatively in the urine. After intravenous injection, 35 per cent can be recovered in 30 minutes; after intramuscular injection, 70 per cent can be recovered in eight hours and nearly 100 per cent in twenty-four hours. The improvement in the clinical picture resulting from the autonomic blockade may persist for a considerably longer period of time.

In 85 hypertensive patients to whom the drug was administered there was a significant fall in both systolic and diastolic pressures in 72 patients. The fall in blood pressure was dependent on the initial pressure. The average systolic decrease following administration of tetraethyl

*Supplied by Parke, Davis and Company.

From The Departments of Surgery, Medicine, and Pharmacology, University of Michigan, Ann Arbor, Michigan.

ammonium was 40 mm. Hg. The intramuscular injection produced a comparable decrease which persisted for several hours. An occasional patient developed normal blood pressure levels for several days. The drug was also utilized with some success in predicting the fall in blood pressure that resulted from splanchnicectomy. In hypertensive patients with nuchal headaches, vertigo, vomiting, and recently impaired vision, tetraethyl ammonium bromide produced an immediate relief of the severe headache and improvement in other symptoms. Three patients with hypertensive heart failure were considerably benefited.

In patients with superficial or deep thrombo phlebitis, particularly in those cases with associated vasospasm, the drug has proven useful [1] as a measure capable of ameliorating vasospasm and [2] as a therapeutic measure in the acute or active cases wherein repeated autonomic ganglia blockades proved advantageous as a supplementary measure in therapy. The duration of effects was variable but for the most part highly satisfactory.

In patients with Buerger's disease (thromb-angiitis obliterans) repeated courses of therapy were carried out periodically. Many of these patients experienced marked improvement in their intermittant claudication. Several cases followed over an 8-month period have had no recurrences of an active process and none of these patients have experienced a return of migratory superficial phlebitis.

Patients with peripheral arterio sclerosis obliterans treated with tetraethyl ammonium bromide with two important observations being made: (1) that after an injection of tetraethyl ammonium bromide, irrespective of peripheral temperature response, nocturual pain was very frequently ameliorated, and (2) if a functional component (vasoconstriction) was demonstrated, the response to tetraethyl ammonium bromide served as an index to the possible benefits that might be derived from a lumbar sympathectomy.

Numerous patients with causalgia, reflex sympathetic dystrophy and allied disorders were given injections of tetraethyl ammonium bromide. The response in this group of patients who ordinarily are exceedingly difficult to treat was highly encouraging. The drug served three useful purposes: (1) it aided in establishing the diag-

COMPARABLE EFFECTS OF SYMPATHECTOMY, ANESTHESIA, SYMPATHETIC BLOCK, LOCAL NERVE BLOCK, AND TETRAETHYL AMMONIUM BROMIDE ON PERIPHERAL BLOOD FLOW AS MEASURED BY SKIN TEMPERATURE RESPONSE.

CASE	AGE	DIAGNOSIS	PEAK TEMPERATURE RESPONSE INVOLVED EXTREMITY. LUMBAR BLOCK	ANESTHESIA	SYMPATHECTOMY	LOCAL NERVE	TEAB.	
C.S.	59	ART.OBLIT.	———	———	32.3——34.2	———	33.2——34.5	THIGH
					30.8——32.2		30.2——32.2	CALF
#					28.9——29.9		28.4——29.9	TOE
A.J.	36	OSTEO.TOE	———	33.2	33.2		33.I——33.2	THIGH
		CAUSALGIA		33.2	33.2		33.0——33.2	CALF
*				3I.4 ———	3I.4 ———	———	29.4——3I.4	FOOT
S.W.	70	ART.OBLIT.	32.5——33.4	32.0	32.7		32.7——3I.4	THI...
		IMP.GANGR.	32.6——32.0 ———	32.0 ———	32.7 ———	———	3I.3——32.3	CALF
**			26.4——27.6	29.4	30.9		28.2——3I.0	TOE
O.L.	65	ART.OBLIT.					3I.7——3I.6	THIGH
		THROMBOSIS	———	———	———		3I.7——3I.6	CALF
						26.4——28.0	26.7——27.6	TOE
G.G.	53	ART.OBLIT.	———	32.3——32.8	32.0——32.0	33.2——33.2	33.4——33.2	THIGH
				32.5——3I.7	32.0——32.0	33.0——32.4	33.0——32.4	CALF
***				27.4——27.4	29.2——3I.8	29.I——29.3	29.2——29.2	TOE
J.M.	5I	ART.OBLIT.	———	32.0——33.2	32.8		3I.2——3I.2	THIGH
				3I.7——3I.8	32.5		3I.2——3I.2	CALF
				25.3——29.0	3I.0		25.I——3I.2	TOE
N.L.	39	BUERGER'S	32.5——33.8				33.3——33.6	THIGH
			30.8——3I.6	———	———	———	32.6——34.3	CALF
			28.5——30.0				3I.4——3I.8	TOE

#—EXACT RISE PREDICTED. PREVIOUS SUPRACONDYLAR AMPUTATION OPPOSITE LEG.
*—MEASUREMENTS FROM INVOLVED EXTREMITY. OPPOSITE LEG DEMONSTRATED COMPLETE SYMPATHETIC BLOCK.
**—TEMPERATURES TAKEN 3 DAYS FOLLOWING SYMPATHECTOMY. HIGHER PEAK TEMPERATURE WITH TEAB.
***—EARLY IN SERIES, DOSE TOO SMALL.

Fig. 1

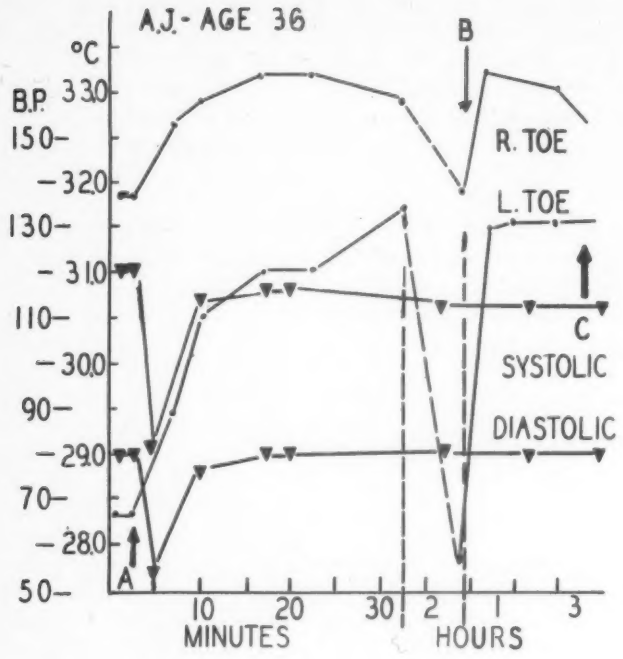

Fig. 2

Blood pressure and peripheral skin temperature response in a patient with arterial occlusive disease (left leg). At A, tetraethyl ammonium bromide was injected intravenously, 250 mg. At B, peripheral skin temperature response to spinal anesthesia, and at C, response to sympathectomy. Note the equivalent response to tetraethyl ammonium bromide.

nosis of reflex dystrophy, (2) it afforded temporary and occasionally sustained relief of pain during which interval active physical therapy could be more satisfactorily employed, and (3) it was effective as a therapeutic (curative) measure in selected cases.

TOXIC EFFECTS

Some patients with very high blood pressures experience a state of peripheral circulatory collapse following the intravenous injection. This is usually quite transient but in a few patients has been profound. It has responded to epinephrine. Others have had a period of hyperventilation. In some, the sensation of weakness, light headedness and fatigue was very pronounced. The drug has been administered more than 1000 times to over 500 patients in the doses indicated with very few alarming reactions.

SUMMARY

1. A large series of patients have been studied utilizing tetraethyl ammonium bromide to produce blockade of the autonomic ganglia. Improvement in circulation as measured by skin temperature and plethysmographic response, plus amelioration of pain of circulatory origin has resulted in many of these cases.

2. Autonomic blockade of a degree comparable to that resulting from the usually accepted methods has been demonstrated in a large number of test cases.

3. With certain precautions, the drug may be injected as an out-patient procedure.

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THE HOSPITAL PHARMACIST, AN ASSET-

IN HOSPITAL MANAGEMEMENT

By Wilma K. Maus
The Association of Hospital Pharmacists
of the Midwest

Within the past decade hospital pharmacy has taken great strides. Ten years ago the hospital pharmacist was an isolated individual, struggling to solve his problems with little besides his training and native ability upon which to rely. College training and retail experience were woefully inadequate as a basis for the specialized field of hospital pharmacy. An additional handicap was the failure of hospital administrators to realize the possibilities inherent in really adequate pharmacy service in their institutions. Poor location of the pharmacy, lack of equipment and low rate of remuneration resulted. Few really capable individuals were attracted to the field of hospital pharmacy. Those whose interest in the field spurred them on, in spite of difficulties, achieved success the hard way.

Organization of groups in larger centers was the natural result of striving to improve hospital pharmaceutical service. These organizations proved of inestimable value through the pooling of individual experience and by raising the professional status of the hospital pharmacist. The benefits of organization have been realized in even greater degree by the formation of the American Society of Hospital Pharmacists, and the publication of a national organ, the Bulletin. Hospital pharmacists, even in remote and isolated institutions can participate in the benefit by the dissemination of practical information leading to improved service in hospital pharmacies. Professional status has improved to a point where Pharmacy in general looks toward the hospital pharmacist as a major means of reestablishing Pharmacy to its proper time honored position among the professions.

A general awakening to the real importance of hospital pharmacy has occurred. Several Colleges and Schools of Pharmacy are now offering courses in hospital pharmacy. Internships in hospital pharmacy are being offered in increasing number, with carefully prepared courses to fit the student interested in hospital pharmacy for any eventuality he might afterwards encounter. A recent instance of this new awareness was the cooperation of the American Hospital Association and the American Pharmaceutical Association with the American Society of Hospital Pharmacists in offering the first Institute on Hospital Pharmacy.

Hospital pharmacy has indeed come a long way in these past ten years. The number of hospitals employing full time pharmacists has increased and the service rendered by these pharmacists has become an asset of great importance, materially raising the health safety factor, increasing the efficiency of operation through greater economy, centralization of responsibility, and coordination with other departments and the staff. This fact is something of which we can all be rightfully proud. But as a group, and as individuals, we cannot be satisfied with the achievement of adequate service in those institutions which we serve as an ultimate goal. Every day thousands enter hospitals lacking the advantages offered by the employment of a full time registered pharmacist. A recent survey by the American Professional Pharmacist shows that less than 2,700 of nearly 8,000 hospitals, clinics and institutions in this country have pharmacies with registered pharmacists in charge. It is part of our social duty to see that the administrative staffs of such institutions become acquainted with the facts regarding the advantages of really adequate pharmaceutical service.

The usual objection to employment of full time pharmacists in hospitals is economical. The administrator and governing board consider the initial expense of establishing a pharmacy without considering what the institution will gain through that expenditure. That is shortsighted, but nevertheless an obstacle which must be surmounted. Facts and figures can be assembled to show that the properly managed hospital pharmacy not only can pay off the original investment and be self supporting, but can be a source of revenue for the institution. Early in 1939 I had

the opportunity of establishing a pharmacy in a hospital of 100 beds in a small Nebraska city. Within the first year the initial expense of remodeling and equipping the pharmacy was entirely paid off and a small profit was realized. That was done at a time when the surrounding territory, an agricultural one, had had six successive years of crop failures due to drouth, with the natural result that collections on hospitalization were at low ebb. At this time, after checking hospital pharmacy net profits in the average small hospital, it is certain the installation of a pharmacy could be paid for in an even shorter time. Inability to afford the services of a full time pharmacist is definitely a faulty motive for depriving the patients and institution of the advantages of these services, since it is based on an incorrect premise.

Some administrators may concede these facts, and doubting that any real economy to the institution will result from the operation of a pharmacy under the supervision of a registered pharmacist, neglect to change their policy. Personal association as pharmacist in several hospitals, varying in size from 50 to 500 beds, and contacts with other hospitals employing full time pharmacists, shows that without exception the hospital pharmacy managed by a capable registered pharmacist is not only self supporting, but actually a revenue producing department. In the Nebraska hospital mentioned previously there was an opportunity to compare the cost of medication per patient prior to, and following the establishment of a pharmacy. A very marked reduction in cost resulted. A survey in Cleveland shows that the cost of medication per patient is much higher in those hospitals which do not employ full time pharmacists. Everyone concedes the ever increasing importance of chemotherapy. Drugs used in the treatment of disease have assumed the proportions of "big business." Any administrator will realize that fact after checking the drug invoices. From a purely economical standpoint, the handling of drugs in the modern hospital requires an expert.

In the average hospital not employing a pharmacist the drugs are stocked in the various nursing divisions in which they are used. Only rarely, especially in the smaller hospital, is an attempt made at centralization of supplies. This frequently leads to overstocking, and coupled with improper storage, results in deterioration of supplies. The actual purchasing is generally a rather haphazard affair, with frequent recourse to local retail pharmacies, thus causing a considerable increase in cost of medication. The present understaffed condition of most hospitals accentuates all the bad features of this and other phases of pharmaceutical service in the hospital lacking a pharmacist. Time is at a premium, and when individuals who already have more duties to perform than will fit into an average day must add the burden of purchasing, storage and dispensing of drugs they are likely to "take the easiest way out" in handling the situation. This invariably adds to the cost of medication and in some cases may actually endanger the welfare of the patient.

A capable pharmacist can save his hospital a great deal of money by his training and experience in intelligent purchasing, handling and storage of drugs. That, however, does not cover all the financial advantages that will accrue to the institution. Stock control, either through education of the staff to the use of official preparations by introduction of the Formulary system or by personal contacts will greatly reduce the inventory and drug costs in general, besides leading to more rational therapy. Manufacturing, keyed to the needs and size of the hospital, can effect still further reduction in the cost of medication. It is obvious that specially trained personnel is necessary to reap these advantages.

Aside from the purely economical gain to the hospital through the employment of a registered pharmacist, specially trained in hospital procedures, many other benefits will result. No progressive administrator can afford to overlook the tremendous factor and influence the really efficient, modern pharmacy will be in the activities of the hospital.

As a source of information and education the pharmacist can become a most important factor in the coordination of work in all departments. With an efficient library, supplemented with current professional literature and his own store of knowledge the capable hospital pharmacist will be in a position to render assistance to all, from the busy physician down to the "handyman."

Considering the great expansion in the field of drugs, no doctor has sufficient time to acquaint himself with all the information pertaining to all the drugs newly introduced into the field, or new developments in the use of older drugs. The type of preparations offered, range of dosage, realm of usefulness, action, side effects, idiosyncrasies, toxicity - in short, anything pertaining to their use, is information offered the busy physician by the hospital pharmacist. The interne and the nurse can profit greatly by this same service. The interne, in fact, learns most of his prescribing habits in

the hospital he serves. Adequate sources of information, possibly supplemented by short courses in prescription writing and therapeutics conducted by the hospital pharmacist will be a worthwhile contribution to the field of medicine. No one is better fitted than the capable hospital pharmacist to present courses to the student nurse in pharmacology and the mechanics of proper care in preparation, handling and administration of drugs.

Along with the educational aspects is a service feature of equal importance. The pharmacy can be a source of information on a great variety of preparations used in the hospital, sterilizing solutions for surgery, stains and reagents for the laboratory, cleansing solutions, liquid waxes and polishes, deodorants, roach and rodent exterminaturs, just to name a few. Expecially in these times of shortages it is a great advantage to have a pharmacist capable of preparing substitutes for commercial preparations of these types, as well as offering information on the best types for use.

Another phase of the question is the handling of narcotics and tax-free alcohol. It would be well for the administrator of the institution lacking the services of a registered pharmacist to consider carefully the legal aspects and demands placed upon him through this lack. Licensure, filling out of purchase forms, records and inventories necessary for the periodic reports is an added burden to the administrator or to whomever he delegates the responsibility. Then too, the ever increasing pressure of other duties is contributing to more and more laxity in the handling of these supplies. Demand for convenience in dispensing often supercedes accuracy and proper safeguards in the handling of narcotics and alcohol. Besides the legal aspect there is a moral responsibility involved. Centralizing the responsibility for licensure, purchase, storage, dispensing and accounting for these supplies in the hands of a consciencious, registered pharmacist will be a safeguard for the welfare of the patients and hospital personnel, as well as from the legal standpoint. It might be well to point out here that the same appiies to the handling of barbiturates and other dangerous drugs.

Despite the diversification of services offered by the modern hospital, the major object of their existance is, as it has been since the establishment of the first hospital, promotion of the welfare of the patient. Anything which materially increases or improves the health service rendered the patient should be of decided interest to the progressive administrator. The establishment of a pharmacy under the management of a specially trained pharmacist does just that. All the services and benefits already mentioned, and many more which have not been touched upon, directly or indirectly improve the extent and quality of service rendered the patient.

Medical and Hospital organizations as a whole recognize and appreciate the advantages resulting from the establishment of a pharmacy in the charge of a full time pharmacist, and much has been done to publicize these advantages in professional magazines. But there is much still to be done. Hospital pharmacists should not wait for other organizations to promote their cause. They should not only endeavor to raise the standards of the hospital pharmacies in which they are employed to the heighth of their efficiency, but should recognize their social obligation in urging the establishment of pharmacies in other institutions now lacking them. Facts and figures proving the advantages offered through the services of an intelligent hospital pharmacist should be presented through the medium of articles written for professional magazines reaching the hospital administrator. Local groups could further publicize the advantages by actual contact with administrators of hospitals in their area who do not employ full time pharmacists. Elaborate surveys are expensive, but a bombardment of reports from individual pharmacists in hospitals of all sizes, should soon convince the hospital administrator, whether his hospital has a capacity of 30 beds or 400 beds, that he has overlooked a factor of utmost importance in the service rendered by his institution.

Besides an educational program this problem can be tacked from another standpoint. Local groups of hospital pharmacists, backed by the American Society of Hospital Pharmacists can bring pressure to bear in individual states to put hospital pharmaceutical practice on the same regulatory level as that legally required of retail pharmacies. Some states have already ruled the responsibility of hospital pharmacies to the state board of pharmacy under the same requirements as retail pharmacies. Protection of public health demands that this safeguard be extended to all states. This would naturally bring about the employment of registered pharmacists in all hospitals now using untrained help for this service. Arousing public opinion and pressure on state legislative bodies to bring this about would be a role well worth the progressive hospital pharmacist's time.

Therapeutic Trends

New Trends in Medicine And Pharmacy Include USE OF CHLOROPHYLL THERAPEUTICALLY - CYSTEINE - ISOPROPYL METHYL ETHER - WILD GINGER AS BACTERICIDAL AGENT - NISULFADINE OR NISULFAZOLE

USE OF CHLOROPHYLL THERAPEUTICALLY

Chlorophyll, the green coloring matter of plants has been used experimentally for the treatment of burns, infected wounds, chronic osteomyelitis and ulcers according to a recent report in The Guthrie Clinic Bulletin (July 1946).

Treating a series of 1,372 experimentally induced wounds and burns with a topical application of 17 popular medicinal preparations, chlorophyll preparations were the only ones which consistently showed any statistically significant effect in accelerating the healing of both traumatic and thermal wounds. Healing time was reduced by about 25 per cent in more than two-thirds of the cases treated. As a result of these and other recent studies chlorophyll is believed to exert a bacteriostatic and a stimulating effect when used on the skin. Also, this property as a tissue stimulant has been successfully utilized in combination with the antibacterial effect of such drugs as sulfas and penicillin. Penicillin and chlorophyll used together resulted in the reduction of 35 per cent in healing time of infected wounds. When treated with chlorophyll and penicillin, infected wounds healed in 10.6 days, whereas under chlorophyll alone they took 14.3 days and under penicillin alone 15 days. These experiments indicate the value of chlorophyll in wound healing. Further clinical studies will be necessary before evaluation of chlorophyll for use therapeutically can be made.

Chlorophyll has been shown to be entirely non-toxic (in the 0.2 per cent saline solution) and may be administered orally, subcutaneously or parenterally without ill effect. No skin irritation or adverse systemic reactions have been mentioned in the literature. On the other hand, mention has been made that many patients have been much more comfortable with chlorophyll dressings than with similar dressings of saline solution, boric acid solution or penicillin.

Chlorophyll has also been used in the treatment of post-irradiation erythema, in sinusitis and in dentistry.

Chlorophyll for experimental use, is supplied as "Chloresium" by the Rystant Company of New York.

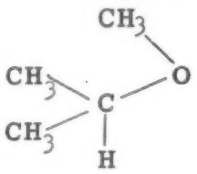
CYSTEINE

Cysteine, the sulfur containing amino acid, appears to exert a beneficial effect on the recovery of liver function in infective hepatitis according to a report in The Lancet (June 15, 1946). Studying a series of 103 cases, using alternate patients as a control, it was shown that the 52 patients with infective hepatitis produced a significant shortening of the period of recovery as compared with the 51 control cases. Since dietary factors are believed to effect the course of infective hepatitis, a comparison of high-fat and low-fat diets was combined with the therapeutic trial of cysteine.

Five grams of dl-cysteine was given daily by mouth - 2.5 grams in the morning and 2.5 grams in the evening - for an average of 11.1 days. Both clinical and biochemical tests were made to determine the effects of treatment on the duration and severity of the disease. A comparison of the progress of 52 patients on a low-fat diet with that of 51 on a high-fat diet revealed no significant difference in the rate of recovery.

ISOPROPYL METHYL ETHER

Isopropyl methyl ether may prove valuable as an anesthetic agent was reported in the Journal of Pharmacology and Experimental Therapeutics by Krantz and others. The potency of isopropyl methyl ether is approximately 25 per cent less than that of ethyl ether. This isomer of ethyl ether compares favorably with ether as an inhalation anesthetic in several species of animals.



Isopropyl Methyl Ether

Experimental studies using isopropyl methyl ether on dogs produced no functional liver damage and the blood pressure of the dog remained essentially unaltered under anesthesia. In the experiments in the rat, dog, and monkey, anesthesias with isopropyl methyl ether produced no histopathological changes in the liver and kidneys. Neither the monkey's nor the dog's heart showed any significant electrocardiographic changes under anesthesia with isopropyl methyl ether. This first approximation of the anesthetic properties of isopropyl methyl ether warrants clinical investigation.

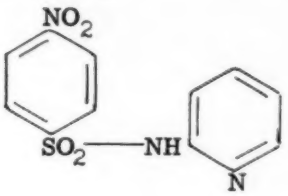
WILD GINGER - BACTERICIDAL AGENT

Wild Ginger, (Asarum canadense), a new bactericidal agent, is believed to be as active as penicillin on some organisms, according to recent studies made in the research laboratories of the Winthrop Chemical Co., Inc. Wild ginger is a plant abundant in woods from New Brunswick to Manitoba in Canada and as far south as North Carolina.

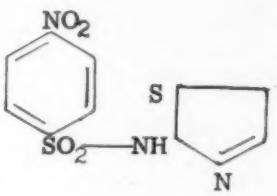
Two antibiotic substances have been found in each specimen of wild ginger which have been classified as A and B. Of these, A has been found to be a potent colorless compound which the chemists have given the tentative empirical formula $C_{21}H_{20}O_8N_2S$. It was found to be active against the pus forming gram-positive bacteria, staphylococcus, streptococcus, and also pneumococcus, but has no effect on intestinal bacteria. B, a lemon yellow acid, has less activity.

NISULFADINE OR NISULFAZOLE

Two new compounds, nisulfadine and nisulfazole, have been used experimentally to treat patients suffering from chronic ulcerative colitis. Of the twenty one patients treated with these new drugs all were greatly improved according to a report in Journal of Laboratory and Clinical Medicine, volume 31, number 2.



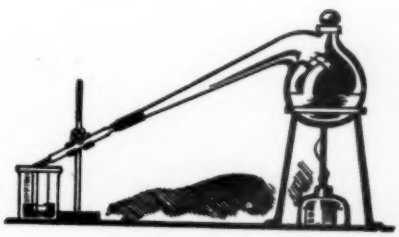
Nisulfadine



Nisulfazole

Chemically, nisulfadine is 2-(p-nitrobenzene sulfonamide) pyridine and nisulfazole is 2-(p-nitrobenzene sulfonamide)-thiazole, the former being related to sulfapyridine and the latter to sulfathiazole. Since nisulfazole produces less nausea, it was found to be the drug of choice and was used exclusively for the experimental studies.

Administering nisulfazole in doses of 2 to 4 grams in twenty-four hours resulted in improvement of the patients. Seventeen of the twenty-one patients were relieved of symptoms and four were markedly improved though still receiving treatment. The drug was administered in three forms - in tablets or a pectin suspension for oral use or in a pectin suspension for administration by rectum. Later enteric coated tablets were used. Nisulfadine and nisulfazole for experimental studies were supplied by the George A. Breon and Co., Inc., Kansas City, Missouri.



STREPTOMYCIN

LATEST INFORMATION ON THE DISTRIBUTION AND INDICATIONS OF THE NEWLY RELEASED STREPTOMYCIN IS PRESENTED FOR THE INFORMATION OF THE HOSPITAL PHARMACIST

Limited commercial distribution of streptomycin after September 1 has been announced by the Civilian Production Administration officials. The plan, as outlined by CPA, will follow that used with penicillin. Streptomycin will be issued to selected hospitals throughout the country, and they will act as depots for their area.

CPA officials said that more than 1,600 general hospitals have been selected as depots for the drug and will supply other hospitals in their respective areas. They were selected with the assistance of an advisory panel including Dr. Chester S. Keefer, National Research Council; Dr. C. J. Van Slyke, U.S. Public Health Service; and Dr. Victor Johnson, American Medical Association. Pending their notification, the names of the depot hospitals were not released by the Chemicals Division.

Beginning September 1, physicians should contact their local hospitals to obtain the drug. CPA's Chemicals Division shortly will give civilian hospitals full information about the distribution plan, the names of depot hospitals and copies of Dr. Keefer's report on the indications, contra-indications, mode of administration, dosage and toxic effects of streptomycin. Depot hospitals will be notified of their September allotments of the drug and told who their suppliers will be.

Chemicals Division officials emphasized that the distribution plan provides that depot hospitals place their orders direct with the designated suppliers, an important difference from the plan used in the initial distribution of penicillin by the War Production Board.

So that the sharply limited supply of streptomycin will be of most use to the greatest number of patients, CPA recommends Dr. Keefer's report as a guide for use of the drug.

The Keefer report summarizes 1,500 cases reported by physicians from all parts of the United States. It particularly recommends use of the drug for treatment of tularemia, hemophilus influenzae infections, bacteremia due to gram negative organisms, urinary tract infections, and meningitis due to certain specific organisms. Streptomycin has been found to be of questionable value in typhoid fever, brucellosis and salmonella infections and to be ineffective in clostridia infections, malaria, rickettsial infections, virus infections and infections with mold and fungi.

The report includes tuberculosis among a number of diseases for which the drug is a helpful agent but states that in the treatment of these its status has not been definitely defined. It emphasizes that streptomycin will not replace any of the established forms of treament and that it should not be used as a substitute for other forms of therapy.

Because of the large quantity of streptomycin (a minimum of 135 to 270 grams) needed to treat tuberculosis, the present supply will not be sufficient for general use against this disease. The average allotment to a depot hospital for all purposes would treat only one tuberculosis patient. In recognition of this fact the committee warns that no patient with tuberculosis should be started on streptomycin without assurance that an adequate quantity will be obtainable.

CPA said that the great quantity of the drug required for tuberculosis study had made it impossible to supply the amount needed adequately to evaluate the role of streptomycin in treatment of the disease.

However, CPA proposes to make available from the increased supply a considerable quantity for continuing clinical research on tuberculosis. Plans for coordinated research under a suitable sponsoring organization are now being considered.

CIVILIAN PRODUCTION ADMINISTRATION

CPAI–3521
Reference A

WASHINGTON 25, D. C. SEPT. 1, 1946

DISTRIBUTION PROCEDURE FOR STREPTOMYCIN FOR CIVILIANS

The Civilian Production Administration controls the manufacture and distribution of all streptomycin by allocation under General Allocation Order M–300 Schedule 119 issued February 21, 1946. The extremely limited supply available has been insufficient to meet urgent needs of the government claimant agencies. Distribution has been restricted to these agencies and to the National Research Council for an integrated clinical research program designed to determine as rapidly and as efficiently as possible those conditions amenable to streptomycin treatment. The only material available for civilians has been that released in connection with the clinical research program. By granting highest priority assistance for construction of streptomycin plants the Civilian Production Administration has sought to increase production as rapidly as possible. Production has increased sufficiently now to permit distribution of a limited quantity of streptomycin for civilian medical use in addition to the amount released for clinical research. A percentage of each manufacturer's production is to be allocated each month for such use.

SUPPLIES FOR CIVILIANS

This limited quantity of streptomycin is to be made available to the greatest number of patients to whom its administration is justified in current medical practice in the shortest period of time and without wasting material. To accomplish this, the Civilian Production Administration has established an interim procedure for streptomycin distribution, to continue until ample supplies are available.

In order to reach immediately the greatest need and because frequent parenteral administration is required, it was recognized that hospitals represented the best mechanism for initial distribution. It was considered impossible to make distribution to all hospitals directly during the initial phase. Supplies will not be adequate at first for complete distribution to hospitals, or for distribution to wholesalers and prescription pharmacies. The interested agencies of government and of medical science as well as the Streptomycin Producers Industry Advisory Committee of the Civilian Production Administration have approved this plan.

DISTRIBUTION THROUGH HOSPITALS

An authoritative group, representing the National Research Council, United States Public Health Service, American Medical Association, and the Civilian Production Administration is serving as an Advisory Panel to the Chemicals Division in the selection of hospitals to act as regional depots for the distribution of streptomycin within the institution itself and to other hospitals nearby. Each "depot hospital" has been notified of its selection. All other hospitals have been provided with a list of the designated depot hospitals in their areas (see enclosure, "Depot Hospitals").

QUOTAS FOR HOSPITALS

Each hospital selected for initial distribution will be given a quota considering bed capacities in the hospital in relationship to the total number of depot hospitals and the available supply of streptomycin. Under this quota hospitals will be permitted to purchase a quantity of streptomycin. These designated depot hospitals receiving streptomycin will be the local depots for further distribution of the drug as well as a source of supply for their own requirements. They should recognize the request of other hospitals and, if the need is established, should to the best of their ability in consideration of their supply on hand, furnish streptomycin for purchase by such other hospitals.

In the event a hospital not on the designated list is unable to obtain streptomycin from a designated depot hospital in its area, such hospital may communicate directly with the Chemicals Division, Civilian Production Administration, Attention: Dr. Edward O. Haenni, Washington 25, D. C., Telephone Republic 7500 Extensions 73267 or 73268.

PROCUREMENT OF STREPTOMYCIN

A quota will be established for each depot hospital for each month, beginning with September 1946. A supplier or suppliers will be authorized to deliver streptomycin each month to specific depot hospitals to supply their respective quotas. Each depot hospital will be notified prior to the first day of succeeding months of the amount of streptomycin each supplier is authorized to deliver to it in that month. The depot hospital will send its orders *directly to the supplier or suppliers* who have been designated to supply its quota for that month.

Each depot hospital is invited to order all or a part of its quota from the authorized suppliers on the first of the month or as soon thereafter as is possible or desirable. Such orders and additional orders *received during the month* up to the total each supplier has been specifically authorized to supply the particular depot hospital in that month will receive prompt handling and shipment by the suppliers. However, suppliers are not authorized to deliver streptomycin on orders received after the last day of the month against allocations made for that month.

As more streptomycin becomes available, any hospital allotment may be increased if special considerations warrant and more hospitals added to the list of depot institutions to permit broader distribution. Such new depot hospitals, if and when they are approved by the Advisory Panel for inclusion in the list of depots, will be given quotas for direct purchase.

SUPPLY SOURCES

All streptomycin now released for medical use has been assayed, tested and approved under rigid standards by the Food and Drug Administration and by the manufacturers themselves. The present limited supply of streptomycin does not permit that consideration be given to preferences or any particular source. Therefore, with the approval of the manufacturers, the Drug Section, Chemical Division, in allocating quotas to depot hospitals will select as sources any one or more firms having material available.

Manufacturers at present and until further notice can legally supply streptomycin to any purchaser only on specific authorization to deliver to that purchaser in accordance with the provisions of Order M–300 Schedule 119.

COSTS OF SUPPLY

It is reasonable to assume that there will be some variation in price schedules for streptomycin. The Drug Section will endeavor insofar as possible to equalize the cost to hospitals by alternating the various manufacturers' products to respective hospitals.

The supplying firms will make suitable charge to the hospital for the material in each firm's customary practice. Non-depot institutions will procure streptomycin from depot hospitals, paying on delivery or being billed for it by the depot hospital in the latter's customary manner.

ALLOCATION UNIT

The unit used in allocating streptomycin will be one gram and orders should be placed in terms of that unit.

USAGE OF STREPTOMYCIN

For the present, each depot hospital receiving streptomycin shall attempt to use the material so far as possible in accordance with the instructions and recommendations presented in the enclosed report ("The Indications, Contra-Indications, Mode of Administration, Dosage, and Toxic Effects of Streptomycin") prepared by the Committee on Chemotherapeutics and Other Agents of the National Research Council, under Chairmanship of Chester S. Keefer, M. D. Additional copies of this report are available from the Chemicals Division.

Hospitals other than depot institutions, although obtaining supplies from the latter, should be guided by these instructions and recommendations.

The indications, contra-indications, mode of administration and dosage included in the report may be modified by later developments, and such modifications will be announced.

When the supply of streptomycin for civilian use increases to the point where it is considered ample, this procedure will be discontinued and all manufacturers will employ their respective methods of commercial distribution through whatever channels they prefer.

STREPTOMYCIN

The Indications, Contra-Indications, Mode of Administration, Dosage and Toxic Effects of Streptomycin

Physicians desiring to use streptomycin hydrochloride or sulfate in therapy may be guided by the following summary.

This report has been prepared by Dr. Chester S. Keefer, Chairman of the Committee on Chemotherapeutics and Other Agents of the National Research Council. It is based upon a study of fifteen hundred cases which have been reported to him by physicians from all parts of the United States.

In releasing streptomycin for use in civilian practice of medicine the Civilian Production Administration desires to make it available to the greatest number of patients to whom its administration is justified. Therefore it recommends Dr. Keefer's summary as a guide for treatment with streptomycin.

Based upon the experience gained with the use of streptomycin in certain infections, it is recommended for use as follows:

GROUP I INDICATIONS

1. All cases of tularemia.
2. All cases of H. influenzae infections:
   - Meningitis.
   - Endocarditis.
   - Laryngotracheitis.
   - Urinary tract infections.
   - Pulmonary infections.
3. All cases of meningitis due to:
   - E. coli.
   - B. proteus.
   - B. Friedlander.
   - B. Lactis aerogenes.
   - B. Pyocyaneus.
   - B. paratyphoid.
4. All cases of bacteremia due to gram negative organisms:
   - E. coli.
   - B. proteus.
   - A. aerogenes.
   - Ps. aeruginosa (B. pyocyaneus).
   - B. Friedlander.
5. Urinary tract infections due to:
   - E. coli.
   - A. aerogenes.
   - B. proteus.
   - B. Friedlander.
   - B. Lactis aerogenes.
   - H. influenzae.
   - Ps. aeruginosa.

INDICATIONS IN GROUP II

Streptomycin has been found to be a helpful agent in the treatment of the following diseases but its position has not been definitely defined.

1. Peritonitis due to gram negative bacilli.
2. B. Friedlander's pneumonia.
3. Liver abscesses due to gram negative bacilli.
4. Cholangitis due to gram negative bacilli.
5. Penicillin-resistant but streptomycin-sensitive organisms infecting heart valves.
6. Tuberculosis.
7. Chronic pulmonary infections due to mixed gram negative flora.
8. Empyema due to gram negative infections.

CONDITIONS IN GROUP III OF QUESTIONABLE VALUE

Streptomycin is of questionable value in the following conditions:

1. Typhoid fever.
2. Brucellosis.
3. Salmonella infections.

GROUP IV CONDITIONS IN WHICH STREPTOMYCIN IS INEFFECTIVE

Streptomycin is ineffective in the following conditions:

1. All Clostridia infections.
2. Malaria.
3. Rickettsial infections.
4. Infections with moulds and fungi.
5. Virus infections.

CONTRA-INDICATIONS TO THE USE OF STREPTOMYCIN

It should be pointed out that while streptomycin may have an inhibiting effect on both gram positive as well as gram negative microorganisms, most strains of gram positive organisms are much more sensitive to penicillin than to streptomycin. Therefore penicillin continues to be the drug of choice in the treatment of staphylococcic, streptococcic, pneumococcic, gonococcic and meningococcic infections. Occasionally an infection due to a gram positive organism may be resistant to penicillin and susceptible to streptomycin. In such instances streptomycin should be used. The decision can be made by testing the infecting organism for resistance to both penicillin and streptomycin *in vitro*.

It should be remembered, therefore, that penicillin continues to be the drug of choice in all susceptible gram positive coccal infections, and in infections due to the gonococcus and meningococcus Streptomycin is the drug of choice in susceptible gram negative bacillary infections.

TOXICITY

All patients who are treated with streptomycin should be watched carefully for various reactions. Streptomycin is not a homogeneous product and certain patients will develop signs of hypersensitivity or toxicity. The following reactions have been recorded:

1. Pain and tenderness at local site of injection.
2. Headache.
3. Fever.
4. Skin eruptions.
5. Tachycardia and fall in blood pressure.
6. Eighth nerve disturbances—i.e., vertigo, tinnitus, deafness.
7. Paraesthesias about the face.
8. Flushing of the skin.

When skin eruptions occur it is well to discontinue the drug. When patients receive streptomycin for three weeks practically all of them develop vertigo which persists in varying degrees of severity for days or weeks after streptomycin is discontinued. It is most noticeable in ambulatory patients and there is some evidence that the vertigo is due to labyrinthian disturbances which are irreversible.

STREPTOMYCIN RESISTANCE AND FASTNESS

Many infections due to gram negative bacilli are extremely resistant to the action of streptomycin. One of the reasons for many clinical failures is the inability to give enough streptomycin to inhibit the growth of the infecting organism. Another reason for failures of treatment is due to the rapid development of resistance to streptomycin *in vivo*. That is to say, many organisms develop resistance to streptomycin with amazing rapidity even when maximum tolerated doses are given early in the course of therapy.

It is recommended, therefore, that all organisms be tested for their sensitivity before the onset of treatment and that adequate amounts of streptomycin be given from the beginning of treatment. That is, a sufficient concentration of streptomycin should be maintained in the tissues and in the urine to completely inhibit the growth of the infecting organisms.

METHOD OF PREPARING STREPTOMYCIN FOR TREATMENT

Streptomycin is supplied in ampoules containing 0.5 to 1.0 gram each. There are two salts in common use, streptomycin hydrochloride and streptomycin sulfate. They are both readily soluble in small amounts of sterile pyrogen free water or normal physiologic saline solution in concentrations of 100 to 125 mgm. per cc. Streptomycin is relatively thermostable and neither the powder nor the solutions show any appreciable loss of potency at room temperature for periods as long as a month. It is well, however, to store solutions in the ice box when not in use.

1. *For Intramuscular or Subcutaneous Injection:*

The total volume of individual injections should be small—i.e. 100 to 125 mgm. per cc. A small amount of 1 per cent procaine hydrochloride solution may be added to the solution to alleviate pain. The local application of an ice bag may also decrease the pain at the local site of injection.

2. *For Intrathecal Injection:*

Twenty to 50 or 100 milligrams may be dissolved in 5 to 10 cc.s of sterile salt solution for injection into the subarachnoid space every 24 hours.

3. *For Intrapleural or Intraperitoneal Injection:*

One-half to one gram may be dissolved in 20 to 50 cc.s of sterile salt solution for injection into the pleural or peritoneal cavity.

METHODS OF ADMINISTRATION OF STREPTOMYCIN

There are three common methods of administering streptomycin—subcutaneous, intramuscular, and intrathecal. Intermittent intravenous administration has no advantage over the intramuscular method and since it may produce disagreeable side reactions this route of administration should be avoided. Intermittent intramuscular injections is the preferred method. The gluteal, thigh or deltoid muscles are best suited for injections, and it is important to rotate the site of injection between doses.

DOSAGE

The dosage of streptomycin will vary from one patient to another depending on the type and severity of infection. The objective in every case is to bring the infection under control as quickly as possible. Inasmuch as acquired resistance *in vivo* occurs rapidly in some patients with infections due to susceptible organisms, maximum doses should be used from the onset.

It is well to remember that resistance may develop in spite of the use of maximum tolerated doses. Also that streptomycin is excreted promptly in the urine. Repeated intramuscular injections every 3 or 4 hours should be employed.

1. *Tularemia.* Dosage—240 milligrams to 1 gram in divided doses of 30 to 125 mgms. every 3 hours for 5 to 7 days depending upon the clinical course of the disease and response to treatment. Intermittent intramuscular injection route of choice.

2. *H. Influenzae meningitis.* Dosage—Intermittent intramuscular injections—0.5 to 1.0 gram daily in divided doses of 50 to 125 mgms. every 3 hours for 5 to 7 days. *Intrathecal* injection of 50 mgms. streptomycin once daily for 7 days. In all cases, blood cultures, throat cultures and spinal fluid cultures should be made daily. Complicating stapyhlococcus infections should be watched for in all cases.

3. *Urinary tract infections.* Dosage—1 to 3 grams daily in divided doses every 3 hours for 5 to 7 days depending upon the type of infecting organism and the clinical response. Constitutional and local signs of infection may disappear without sterilization of the urine. Factors that interfere with the sterilization of the urine are obstruction to the free flow of urine, renal calculi and the development of resistance of the infecting organism, or the appearance of new and resistant organisms. The most sensitive organisms are B. Proteus, Ae. aerogenes, B. Friedlander, E. coli. More resistant organisms are Ps. aeruginosa, Salmonella, Streptococcus faecalis, Enterococci.

4. *Bacteremia due to susceptible gram negative bacilli.* Dosage—2 to 4 grams daily in divided doses every 3 hours for 7 to 10 days depending upon site of lesion, species of organism and response to therapy.

5. *Peritonitis due to gram negative bacilli.* Peritonitis being a complex infection often due to a mixture of organisms some of which are sensitive to penicillin and others to streptomycin, it is difficult to assess the relative importance of streptomycin and other forms of therapy which are employed in a given case. In view of experimental studies in peritonitis of animals and the studies which have been carried out in man, there are reasons for believing that streptomycin is helpful in this group of diseases. Dosage—2 to 4 grams daily in divided doses every 3 or 4 hours for 5 to 10 days.

6. *Liver abscess and cholangitis.* Streptomycin is excreted in part in the bile and for that reason it has been used in cases of liver abscess and cholangitis with varying results. When susceptible organisms are present it may assist in inhibiting the infection. The dosage is the same as in the case of peritonitis.

7. *B. Friedlander's pneumonia.* Some strains of Friedlander bacilli are extremely sensitive to the action of streptomycin. A few acute cases with pneumonia have recovered. Two to three grams a day for 5 to 10 days should be used. The cases of chronic Friedlander's infection of the lung have not responded in a permanent fashion.

8. *Chronic pulmonary infections due to mixed bacterial flora.* Streptomycin parenterally or by inhalation has proved of value in some patients with chronic pulmonary suppuration. When used by inhalation, concentrations of 50 mgm. per cc. may be inhaled in a total amount of 500 mgm. over a 24 hours period. Parenteral injections of 1 to 3 grams a day in divided doses have been used.

9. *Endocarditis.* Occasional patients with bacterial endocarditis due to penicillin resistant and streptomycin sensitive organisms may recover temporarily following streptomycin therapy. The dosage should be 2 to 4 grams daily in divided doses for a minimum period of 3 to 4 weeks.

10. *Tuberculosis.* In view of the present limitation of supplies of streptomycin and the uncertainties of the amounts that will be available in the next six months, it is the opinion of the Committee that no patient with tuberculosis should be started on treatment with streptomycin unless the physician is reasonably certain that he can obtain enough material for a minimum period of 3 to 4 months treatment, using 1.5 to 3.0 grams daily—(a minimum amount of 135 to 270 grams for an individual patient). Moreover, every patient should be warned that when streptomycin is given in this amount they will develop vertigo which is due to disturbances in the labyrinth which are irreversible. That is to say, they are permanent. Once vertigo appears, many patients learn to compensate for it so that it becomes less noticeable with the passage of time but caloric tests show that disturbances in vestibular function are permanent.

Insufficient or inadequate treatment will inevitably lead to many disappointments. It should be stressed that streptomycin will not replace any of the established forms of treatment and it should never be used as a substitute for other forms of therapy.

11. *Empyema.* The use of streptomycin locally in the treatment of empyema may end in the sterilization of the cavity. The injection of 0.5 to 1.0 gram daily directly into the pleural cavity along with systemic treatment should be used in all cases.

DISEASES IN WHICH THE EFFECT OF STREPTOMYCIN IS QUESTIONABLE

1. *Typhoid fever.* From the results that have been obtained so far there is no evidence that streptomycin shortens the clinical course of typhoid fever. The dosage has been from 4 to 5 grams daily in divided doses intramuscularly every 3 hours for 10 to 14 days.

2. *Salmonella infections (systemic).* So far the results have been inconclusive when 4 grams are given daily in divided doses intramuscularly every 3 hours for 7 to 17 days.

3. *Acute brucellosis.* The course of an acute attack of fever due to brucellosis is not appreciably shortened when 4 grams are given daily in divided doses intramuscularly every 3 hours for 10 to 14 days.

CURRENT LITERATURE

OF HOSPITAL PHARMACY

HOSPITAL MANAGEMENT (July 1946)

"What The Nursing Department Expects From the Pharmacy Department" by Sister M. Berenice, Administrator, St. Anthony's Hospital, St. Louis, Missouri - from a paper presented at the Conference of Hospital Pharmacists, Tri-State Hospital Assembly, Chicago, 1946 - An effciently managed pharmacy department and an interested pharmacist can do an unlimited good for the hospital. The nursing department expects the pharmacy to have definite policies. page 74

HOSPITALS (June 1945)

"Organizing the Pharmacy for Preparation of Sterile Medications" by Ann P. Godley, M.S. and Leo F. Godley, M.S., New York University Medical College Clinic - The preparation of various sterile solutions describing the type of equipment required is discussed. Also, a classified list of medications which can be prepared in the solutions room is included. page 78

"Statistical Analysis Shows Several Thousand More Pharmacists Needed" by Hans S. Hansen, pharmacist, Grant Hospital, Chicago - Enough pharmacists are needed to insure the patient complete pharmaceutical service. A list of duties required of the pharmacist to insure this service is included. page 69

SOUTHERN HOSPITALS (July 1946)

"With the Hospital Pharmacist" by D. O. McClusky, Jr. - News items of interest to hospital pharmacists including brief descriptions of new drugs - isomer of ethyl ether - monacrin - methionine and carbamide. page 70

"A Day At The Emory Drug Room" by Lillian T. Price, C. Ph., Emory University Hospital, Atalanta, Georgia - Description of the duties of the pharmacist at Emory Hospital from a paper presented at the meeting of the Southeastern Hospital Pharmacy Association at Jacksonville, Florida. page 72

SOUTHERN HOSPITALS (August 1946)

"With the Hospital Pharmacist" by D. O. McClusky - Monthly column including a brief review of Streptomycin. page 72

"Efficient Pharmacy Means Improved Hospital Service" by John Zugich, president, Southeastern Society of Hospital Pharmacists - Ways to expand the service of the service type hospital. page 76

AMERICAN PROFESSIONAL PHARMACIST (June 1945)

"Hospital Pharmacy and Tax-Paid Alcohol" - Continuing the discussion of the problem of handling tax-paid and tax-free alcohol under various conditions in the hospital, with reference to allocation, record-keeping and tax drawback for proper use. page 552

AMERICAN PROFESSIONAL PHARMACISTS (July 1946)

"Hospitals and Tax-Paid Alcohol" - A continuation of articles in previous issues. page 654

JOURNAL AMERICAN PHARMACEUTICAL ASSOCIATION (July 1946)

"Board Regulations of Hospital Pharmacy" by Leo Godley, American Society of Hospital Pharmacists - State boards must recognize that the same standards of pharmaceutical practice must be maintained in hospitals as in retail pharmacies. Several states have already enforced laws. page 315

Timely DRUGS

BENZEDRINE SULFATE INTRAVENOUS INJECTION . . . used to overcome acute barbiturate poisoning is available in 1 cc. ampules containing 10 milligrams of racemic amphetamine sulfate per cc. from Smith, Kline and French Laboratories, Philadelphia, Pennsylvania.

Used successfully in controlling the effects of barbiturate poisoning, benzedrine sulfate does not incur the risk of dangerous convulsions such as often occur when picrotoxin is administered in large amounts necessary to overcome barbiturate narcosis. The central stimulant effect of benzedrine sulfate specifically counteracts the soporific action of the barbiturates, thus shortening the period of unconsciousness. Also, because of its sympathomimetic activity it produces increases in blood pressure, rate and depth of respiration and pulse rate.

Benzedrine sulfate injection is contraindicated in patients hypersensitive to ephedrine-like compounds, or where there is great excitability, or manic or hypomanic tendencies. In high dosage, it may cause an appreciable rise in blood pressure persisting for several hours. It should therefore be used with caution in hypertensive cases, and should not be used in coronary disease or other cardiac conditions in which vasoconstrictors are contraindicated. Atropine, stromonium and scopolamine enhance its pressor effect. Overdosing is commonly characterized by marked dilation of the pupils, sleeplessness and inability to relax. Reduction of dosage is usually sufficient, but, if necessary, these symptoms may be controlled by mild sedatives such as the barbiturates.

MANDELAMINE . . . (Methenamine Mandelate) is a new urinary antiseptic of low toxicity and broad therapeutic activity in urinary infections. It is formed through the chemical combination of 0.13 gram of mandelic acid and 0.12 gram of methenamine. Used in the treatment of urinary infections, one tablet is administered orally four times daily, after each meal and before retiring. No restrictions are made in the diet or in the quantity of liquids ingested. Approximately 74 per cent of the 200 patients responded to mandelamine therapy. The average duration of therapy required to sterilize the urine was 6 days, although some cases, such as pyelitis, were favorably affected in 3 days, whereas infections associated with deep-seated or obstructive lesions required as long as 2 weeks before favorable response to therapy was obtained.

Mandelamine was found to be virtually nontoxic in therapeutic dosage. Untoward symptoms of a mild nature which might be attributed to the drug occured in less than 3 per cent of the cases. Its nontoxic nature and effective antibacterial action against the organisms most frequently encountered in the urinary tract, establish this drug as a valuable agent for controlling common urinary infections. Mandelamine is available from the Nepera Chemical Company, Yonkers, New York.

PROVATOL . . . is Wyeth's name for carotene with vitamin D (Smaco product 525) a synthetic vitamin A and D preparation. Provatol has been successfully substituted for cod liver oil and other antirachitic oils which have at times been responsible for "upsets" in the exzematous and asthmatic child. The dose for infants is 8 drops; for children 1 to 12 years, the dose is 12 drops. Provatol is available in 50 cc. dropper bottles from Wyeth, Incorporated, Philadelphia, Pennsylvania. Each gram provides 7,500 U.S.P. units vitamin A activity as derived from carotene (pro–vitamin A) and 1,500 U.S.P. units vitamin D (activated ergosterol) in seasame oil.

SUPPROTEIN . . . (Protein Hydrolysate, Lilly) is a hydrolysate of fish, primarily muscle, which is being used experimentally to treat hypoproteinemia. This preparation is capable of creating a positive nitrogen balance in those patients who are in negative balance. Supprotein is supplied as a 6 per cent solution in 1000 cc. flasks. It furnishes about 7 milligrams of nitrogen per cc. The pH of the solution is 4.86. Though Supprotein is not yet available commercially, Eli Lilly and Company are supplying it for experimental studies.

rt P. Lauve addresses the Institute on Hospital Pharmacy

Robert P. Fischelis, Ph.D.

INSTITUTE ON

From 28 states, the District of Columbia Puerto Rico and Canada came 136 hospital pharmacists to Ann Arbor, Michigan July 15 for the first Institute on Hospital Pharmacy to be held in America. Ohio, New York, and Pennsylvania were represented with the greatest attendance, 17 hospital pharmacists attending from Ohio, 16 from New York and 14 from Pennsylvania. Other states with high attendance records included Michigan, Illinois and New Jersey.

Hospital pharmacists attending the Institute represented hospitals of all sizes and types - most of the registrants came from voluntary general hospitals but a few were from proprietary; several from government; some from special hospitals such as children's; and two pharmacists from professional stores attended. Only one pharmacist from a less than 50 bed hospital attended; 7 were from hospitals under 100 beds; 24 were from 150-299 bed hospitals; 21 were from 300-499 bed hospitals; and 23 were from 500 and over bed hospitals. Expenses at the Institute were paid by the hospitals of 114 of those attending, 14 of these being paid in part only.

Housing accommodations for the entire group were provided for at Stockwell Hall, one of the University dormitories located close to University Hospital. A separate wing of the building was

Austin Smith, M.D.

Hans S. Hansen

Albert C. Kerlikowske, M.D.

HOSPITAL PHARMACY

set aside for the 28 Sisters attending the Institute. All the meetings were held in a spacious room of Stockwell Hall which provided for a schoolroom arrangement ideal for this type of meeting. This plan made it possible for most of the Sisters to attend the evening panels which were an important part of the program. A public address system was set up in the meeting room and recordings were made of the proceedings of the Institute. A social hour for all those attending the Institute was held on Monday evening.

The Institute was indeed fortunate to have the cooperation of representatives of allied professions. Representing the American Pharmaceutical Association was Dr. Robert P. Fischelis, secretary of the organization, who extended greetings to the group and was chairman of the first panel discussion held on Tuesday night and chairman of the first day's sessions. In addition to Dr. Fischelis, the Institute enrollees also had the privilege of hearing Dr. Hullerman of the American Hospital Association, Dr. Malcolm MacEachern of the American College of Surgeons, Dr. Austin Smith, secretary of the Council on Pharmacy and Chemistry of the American Medical Association, Dr. Clifford Price of the Food and Drug Administration, Dr. Teufel of the United States Public Health Service, Dr. Cataline of the University of Michigan School of Pharmacy and Dr. A. C.

Hugo V. Hullerman, M.

Malcolm T. MacEachern, M.D.

Hansen Scott Zugich Francke Clarke Phillips Lauve Cole

A view of the discussion panel at one of the round tables at the Institute on Hospital Pharmacy.

Evlyn Gray Scott

John J. Zugich

Kerlikowske, director of University Hospital. A question period followed each talk while evening sessions of Tuesday, Wednesday and Thursday were devoted to round table discussions on "Pharmacy Administration and Policy," "Parenteral Medication" and discussions of the day's topics. Leading the panel each evening were members of the faculty.

Sponsored jointly by the American Pharmaceutical Association and the American Hospital Association in cooperation with the American Society of Hospital Pharmacists, the Institute was designed to present in concentrated form a basic and integrated course by competent leaders in the field of hospital pharmacy. The program was constructed to cover a wide variety of subjects of interest to the pharmacist in the small as well as the large hospital. Lectures and demonstrations dealing with the hospital pharmacy policy and administration, the preparation of parenteral medication, pharmaceutical manufacturing, and recent trends and developments in the field of new drugs made up the five-day program.

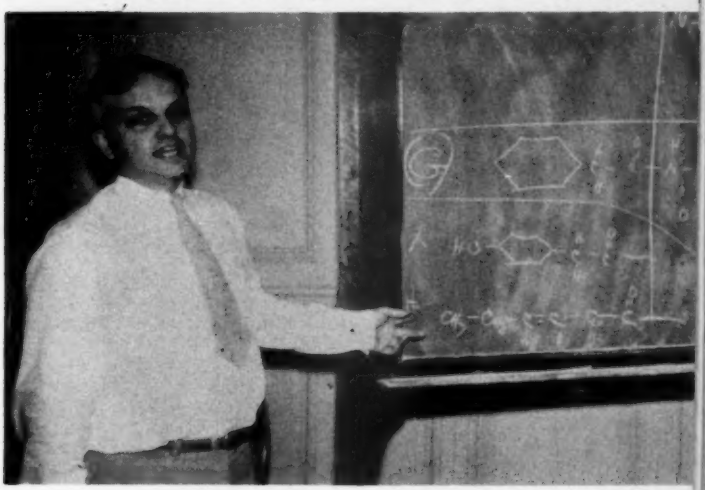
Initiating the lectures at the Institute, Dr. Malcolm T. MacEachern, associate director of the American College of Surgeons, stressed the importance of the hospital pharmacist in the efficient operation of the hospital. Choosing as his theme "Hospital Organization and Management," Dr. MacEachern pointed out the relationship between the Pharmacy and other departments of the hospital and advocated "that the hospital pharmacists be invited to attend staff conferences in the hospital as he can be of possible valuable aid in explaining the actions, limitations and other characteristics of new drugs."

"Hospital Pharmacy Policy and Administration" constituted one main theme of the program. No attempt can be made here to present even

Lauve Hansen Smith Scott Price

A view of one of the discussion panels at the Institute.

George L. Phillips and Grover C. Bowles



Walter J. Nungester, M.D.

W. C. Teufel, M.D.

Clifford C. Price, M.D.

the salient points of the lectures and discussions. Rather, we can only briefly indicate the scope of material discussed. In the talk covering hospital pharmacy and administration, an attempt was made to cover the subject in a broad manner and, in addition, to emphasize certain spheres of activity open to the hospital pharmacist. The broader aspects of the problem were given consideration by Albert P. Lauve of Charity Hospital, New Orleans who discussed the "General Functions and Policies of the Pharmacy Department," Hans S. Hansen of Grant Hospital, Chicago, who considered the "Physical Aspects and Equipment of the Pharmacy Department" and Evlyn Gray Scott, St. Luke's Hospital, Cleveland, who reviewed "Pharmacy Records."

Giving significance to the more specialized activities of the hospital pharmacist, the panel discussion on "Teaching of Materia Medica to Student Nurses" emphasized the value of such a service by the pharmacist not only to the student nurse and the hospital, but also to the pharmacist himself.

Clarifying the role of the pharmacist on "The Therapeutics Committee and the Hospital Formulary" Don E. Francke pointed out the close relationship between the therapeutics committee and the hospital formulary and indicated the steps necessary for the formation of the committee and the adoption of a hospital formulary.

Stressing that "The Annual Pharmacy Report" is a medium through which the pharmacist may reach his administrator to justify further additions to his equipment, personnel and floor space, John J. Zugich of New Haven Hospital reviewed several types of annual pharmacy reports and gave examples of methods of compiling the reports.

"Manufacturing in the Hospital Pharmacy" was the theme of another group of lectures. Beginning

with a discussion of the manufacturing equipment used in the pharmacy, the series of talks was carried forward by other speakers who gave specific formulas and technics for pharmaceutical preparations in common use in their hospitals.

More than a day was devoted to the discussion of "Parenteral Medications." Beginning with a discussion of the "Physical Aspects and Equipment for Sterile Solution Room" by Donald A. Clarke of the New York Hospital, the subject was carried forward by Albert P. Lauve who spoke on the choice and maintenance of stills for the production of distilled water, the prevention and removal of pyrogens, and washing and bottling equipment.

Methods of sterilization and their indications were considered by Evlyn Gray Scott while George L. Phillips, University Hospital, Ann Arbor, discussed methods of assay and sterility tests on parenteral medications. Several specific formulas with detailed technics and precautions for parenteral fluids were also given.

An evening round table discussion period was devoted to parenteral medications. The great interests in this subject was indicated by the multitude of questions submitted: in fact there were so many that many of them had to be carried over to the next evening.

Carrying those attending the Institute into the realm of things to come in therapy, Dr. Austin Smith, editor of New and Nonofficial Remedies spoke on "Drug Therapy of the Future." "The Antibiotics" were discussed by Dr. Walter J. Nungester of the University of Michigan Medical School while Dr. Clifford C. Price discussed "Streptomycin." Dr. W. C. Teufel spoke on "Modernizing Pharmaceutical Service in Hospitals" and Dr. E. L. Cataline discussed "Washable Ointment Bases."

Climaxing the program of the Institute was a dinner held at the Michigan League after which certificates were awarded those attending the five-day sessions.

By PAUL COLE
Chief Pharmacist
Michael Reese Hospital, Chicago, Ill.

AT THE INSTITUTE

Possibly, I should preface this article with the following: "Allow me to make a commitment. I am a Northerner (damnyankee if you please) but my thoughts and actions run south of the Mason and Dixon line. You see, my wife is a Southerner from the deep south where they do things differently."

Southerner, northerner, easterner, westerner, Canadian and Puerto Rican—all united and listened, talked and demonstrated one of the finest institutes ever presented by the American Hospital Association (Council on Professional Practice) with the combined efforts of the American Society of Hospital Pharmacists and the American Pharmaceutical Association. Sponsoring organizations were the University of Michigan, Michigan Hospital Association, and the American College of Surgeons.

The home of the institute was the University Hospital of the University of Michigan at Ann Arbor, and a more perfect setting could never be found, I am sure. In the midst of one of the most beautiful campuses in the United States, we attended our lectures and discussions. The hospital pharmacists arrived by devious routes using every means of conveyance. Some arrived by air, some by train, some by boat, some by car, and some even walked. Even the weather was satisfactory. During July 15th through the 19th, we had cool weather which suited the northern inhabitants; then warm dry weather for the southerners and westerners; and hot sultry weather for the lake regioners.

Approximately, 150 hospital pharmacists attended the Institute from twenty-eight states, Canada, and even one came from Puerto Rico. The institute primarily centered at Stockwell Hall which is a women's dormitory during the school year. One end of the dorm faced the University Hospital and the other end faced a cemetery. Often instituters referred to their rooms' locations as the "sick end of Stockwell" or the "dead end of Stockwell."

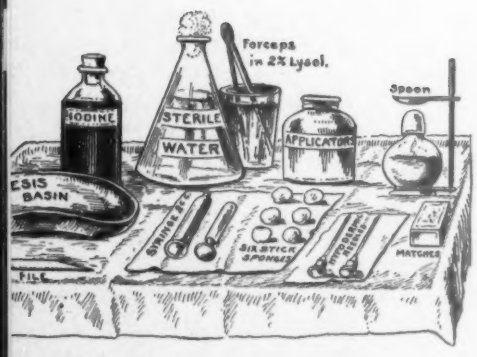
Practically every phase of hospital pharmacy was covered by a host of excellent and well informed speakers who are considered to be the top men in the field of hospital pharmacy. These lectures were supplemented with panel discussions in the evenings, one of which lasted until 11:30 P.M. As one speaker referred to the asterisks in his paper, he stated, "the stars indicate this goes on and on and on" then added, "Just like Evlyn Gray Scott." Seriously though, the instituters attended lectures and panels conscientiously. In fact, perfect attendance was recorded for all sessions.

On Monday, July 15, the institute opened with a conducted tour of one of the finest teaching hospital pharmacies in the country. Here, we saw what an ideal pharmacy should contain and do.

The first evening was devoted to a social hour where fellow-pharmacists became acquainted with neighboring pharmacists and became ardent life-long friends. The final evening was devoted to an excellent dinner and the awarding of certificates.

I heard and saw one individual conduct an unannounced course in hospital pharmacy economics that would make one turn green with envy. The institute provides a wonderful basic concentrated course on hospital pharmacy but I've seen and heard more pharmacy before, during, and after the institute's programs than I will ever be able to retain.

rma Segula, R.N. demonstrates the facility h which hypodermic drugs in solution may withdrawn



Old style hypodermic tray.

NOTES *and*

SERVICE TO THE HOSPITAL

That forty-four hours of nurses' time may be saved for each liter of narcotic drug prepared and sterilized in solution ready for immediate injection was an important point brought out at the recent Institute on Hospital Pharmacy. In these days when the scarcity of nurses is still acute, hospital pharmacists may render a valuable service to their institution by suggesting and implementing this procedure of handling narcotic drugs.

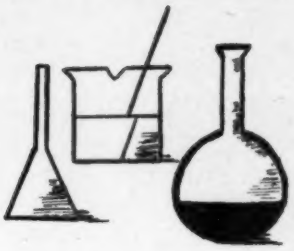
Using the old, cumbersome spoon-method of preparing hypodermics for administration, a major portion of the time involved is consumed in boiling the water in a spoon, drawing a measured portion of boiled water into the syringe, emptying unused water from the spoon, adding the measured amount of boiled water to the spoon, dissolving the hypodermic tablet in the measured water, and drawing the solution back into the syringe.

When the pharmacist prepares and sterilizes the narcotic drugs in solution, employing a vial fitted with a rubber diaphragm stopper, similar to the type vial in which penicillin is dispensed, the most time consuming of these steps are obviated. With the drug sterile and in solution it is only necessary for the nurse to sterilize the rubber stopper of the bottle, insert the needle and withdraw a measured portion of the solution. In the several hospitals where this method is used it not only saves a considerable amount of nurses' time but the method is so much more convenient that after using the procedure, nurses are reluctant to return to the spoon method.

One of the early objections to having the drugs in solution ready to inject was the loss that occurred by the habit of nurses drawing an excess amount of solution into the syringe and then squirting a small amount into the air, in order to get the exact dosage ordered. Of course this resulted in a waste of the narcotic drug and made it difficult to account for the volume of solution originally placed in the vial. However, this objection was easily overcome by instructing the nurse to invert the vial with the needle still through the stopper and empty the excess solution back into the vial.

Since codeine and morphine are two of the drugs used routinely in all hospitals these medications are often among the first chosen to be prepared in solution. In addition, some Pharmacists prepare solutions of atropine, scopolamine, dihydromorphinone, as well as combinations of morphine and atropine, and morphine and scopolamine. The pharmacist will have little difficulty with these solutions and they may be readily prepared and sterilized using standard procedures.

SUGGESTIONS



CODEINE PHOSPHATE 64 mg./cc.

Codeine Phosphate	64.0 Gm.
Chlorobutanol	5.0 Gm.
Sodium Chloride	7.1 Gm.
S.S. F.D. and C. Blue #1, 2%	1.25 cc.
Freshly Distilled Water, to make	1000.00 cc.

Dissolve the chlorobutanol in warm water. Add the codeine phosphate and sodium chloride. Filter. Add the dye solution. Fill into 25 cc. serum vials. Autoclave at 120° C. for 15 minutes. The pH of the solution after sterilization is 4.0. The blue dye, added to obviate error in administration, may be obtained from the National Aniline and Chemical Company, 40 Rector Street, New York City.

MORPHINE SULFATE 10 mg./cc.

Morphine Sulfate	10.0 Gm.
Chlorobutanol	5.0 Gm.
Sodium Chloride	7.1 Gm.
S.S. Sitro (Yellow dye) 1%	1.0 cc.
Freshly Distilled Water, to make	1000.0 cc.

Dissolve the chlorobutanol in warm water. Add the sodium chloride and morphine sulfate. Filter. Add the dye to the filtered product. Fill into 25 cc. serum vials. Autoclave at 120° C. for 15 minutes. The pH of the solution after sterilization is 3.5. The yellow dye, Sitro, may be obtained from the National Aniline and Chemical Company.

Discarded penicillin bottles may be used to package the solution. Upon repeated sterilization, the alkalinity of the glass will sometimes cause a precipitate to form in the finished solution. To prevent this the bottles may be treated with a mixture of one part of concentrated hydrochloric acid and nine parts of water prior to the final rinse before filling the bottles with the narcotic drug. If preferred, other bacteriostatic agents, such as 0.5% phenol or the parasepts, may be used. A mixture of 0.026 grams of methyl para-hydroxybenzoate and 0.014 grams of propyl para-hydroxybenzoate in 100 cc. of freshly distilled water may be used. Rubber stoppers to fit penicillin bottles may be ordered from the Eberbach Company, Ann Arbor, Michigan or any other supply house. They may be designated as Eberbach Catalogue number 14-126, serum stopper with skirt number 34.

Fig. 27.—New Type of Cabinet for the Multiple Preparation Meth Administering Drugs by Hypodermic. (Dodds, Petry Koepke, Am. J. Nurs., *40:* 1345, 1940.)

Grover C. Bowles demonstrates the measurement of narcotic solutions

MEASURING NARCOTIC SOLUTIONS

One of the problems involved when dispensing narcotic drugs in solution is their accurate measurement for purposes of record. This problem may be readily solved by using a calibrated syringe with a two-way valve attachment as shown in the accompanying photograph. The two-way valve is connected by means of rubber tubing to the outlet of the leveling bulb. The two-way valve permits the syringe to be filled with the narcotic solution--as the plunger is pulled out to the 10 cc. mark the solution enters the syringe through the valve. The measured solution is then transferred to the vial. Using this method 20 cc. of solution may be measured and transferred to the vial in about 15 seconds. By using a cannula, or omitting the needle at the end of the syringe the speed of filling vials can be greatly increased.

The illustrated 10 cc. glass syringe is designated number 10LLC-Luer-LOK Control. The two-way valve may be ordered as number 470V. A special small diameter rubber tubing may be ordered as number 606T, usually six feet is required. All items may be obtained from Becton, Dickinson and Company, Rutherford, New Jersey.

Another question to be decided when dispensing narcotic drugs in solution is "What percentage of loss of the solution is reasonable to allow the nurse, taking into consideration the large number of times she must withdraw a dose from the vial?" Usually from 5 to 8 percent loss of solution is allowed. Thus from a vial containing 20 cc. of solution the nurse should account for from 18.4 cc. to 19 cc. At the Institute, one pharmacist stated that Federal Narcotic authorities in his area allow a 6 percent loss due to dispensing.

PENICILLIN DILUTION APPARATUS

Penicillin may be conveniently diluted using the Luer-Lok syringe and two-way valve described above. After the vials have been diluted the air pressure within the vial may be released by puncturing the diaphram cap with a sterile needle. Pharmacists in hospitals which use 100 vials of penicillin per day may save approximately $2000 annually by the use of this method. This figure is based on the use of 50 vials of diluent per day, costing 12 cents each, or $6.00 per day. Equally important is the great saving in nurses time. One adaptation of the penicillin dilution apparatus is shown below.

Filling penicillin vials

PROPYL THIOURACIL

Edwin B. Astwood, M.D.*
and
Willard P. VanderLaan, M.D.*

Thiouracil has been extensively investigated in the treatment of hyperthyroidism and it is generally agreed that all cases, regardless of severity, can be controlled by compounds of this type. It is now apparent that antithyroid therapy is not just a temporary measure or one to be used before surgery but a definitive treatment in itself, one which gives rise to sustained remissions in a large proportion of cases. The one objection to thiouracil is the significant incidence of the serious complications - drug fever and agranulocytosis.

A continued search for an antithyroid compound of high clinical effectiveness but unassociated with side effects has resulted in the selection of propylthiouracil.[1] This compound has been used exclusively for more than a year and a recent analysis[2] of the first 100 cases treated at the Pratt Diagnostic Hospital has shown that the use of this derivative of thiouracil is not attended by untoward side effects. Propylthiouracil is now being widely investigated in many clinics and it is already apparent that this substance is superior to thiouracil and that toxicity no longer need be a consideration in the choice of therapy.

These advances call for a revision of current practices, as they have made the treatment of thyrotoxicosis a simple and safe procedure that can be carried out by any practitioner of medicine. Only the most severe case requires hospital care; the majority of patients can continue their work while being treated. Iodine in any form must be avoided because prior iodine treatment may greatly delay the response to specific therapy. Surgical procedures are considered to be unnecessary except in rare instances for appearance' sake.

When the diagnosis of hyperthyroidism has been made, propylthiouracil is given in a dose of 100 or 150 mg. daily. Severe cases, those with large nodular goiters, and those which have recently received iodine receive the larger dose, 50 mg. every 8 hours (e.g. at 7 a.m., 3 p.m. and 11 p.m.); this dose is continued until all symptoms and signs of the disease have disappeared and the patient has regained health and normal weight. Mild or moderately severe cases are given 50 mg. every 12 hours. This dose usually is sufficient; but in a few cases it may have to be increased to the larger dose if, after a month or so, progress seems to be unduly slow. Symptomatic improvement may be noted within a few days, but some individuals may require several months for the complete disappearance of all signs of the disease. When normal health has been regained, 75 mg. and later 50 mg. are given daily and the minimal maintenance dose consistent with continued euthyroidism is given for a period of at least 6 months. The majority of patients remain well if treatment has permitted a 6-month period of good health. A few patients experience a relapse after a single course of therapy and require a further period of treatment with the previously determined maintenance dose. There is no reason to believe that any harm results from long-continued therapy.

If an excessive dose is given for many weeks symptoms and signs of hypothyroidism supervene and if the dosage is not reduced frank myxedema may result. The thyroid gland may quickly enlarge when hypothyroidism is induced and this is a useful sign of excessive dosage because otherwise during the course of treatment the gland slowly regresses. Should hypothyroidism be inadvertently induced, a reduced dose permits prompt recovery.

Exophthalmos may be the most prominent feature of Graves' disease; its cause is unknown and there are no specific measures for its treatment. It is our belief that the best treatment for the ophthalmopathy of Graves' disease is the proper control of the hyperthyroidism. In severe cases the eyes may be slow to improve but recent experience shows that the best results follow the complete control, by means of propylthiouracil, of the associated thyrotoxicosis.

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2. Astwood, E. B. and VanderLaan, W. P., To be published.

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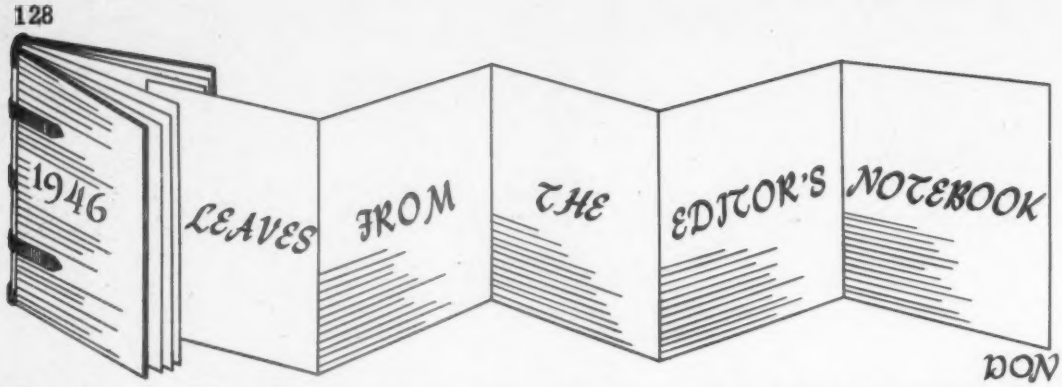

DON E. FRANCKE

July 10 . . . . Finished now with materia medica classes and ready to complete many of the last minute details of the Institute. In planning for the social hour find it difficult to get a suitable room large enough to accommodate the 150 people to be socialized. Finally decide on the spacious living room at Stockwell Hall, in spite of the University ruling of - smoking in the recreation room only, please.

July 13 . . . . First to arrive for the Institute was Charles Roe who drove out from Iowa. Since the dormitory was not yet open for enrollees, found him a place to stay in the intern quarters. Lots of work this Saturday afternoon getting material written to distribute at the Institute. Gloria Niemeyer, busy as usual, now trying to cut a dozen stencils for parenteral fluid formulas and at the same time answer the phone and take "calls" for the Pharmacy. At night to Stockwell Hall to consult with Dr. Hugo Hullerman, the American Hospital Association's ace who has had so much experience in conducting institutes and who has done so much work and has been cooperative in the great amount of planning involved.

July 15 . . . . All morning spent in helping to get the program under way. Thanks to the assistance of the entire Pharmacy Staff who left their work to conduct the numerous tours of the Department, taking great care to fully explain the many details that the enrollees were curious about, everyone was finally registered and shown through the hospital. A call from Stockwell Hall to come over and place the public address system, screens and projectors and to be instructed on regulating the public address system, was an unexpected interruption. For some reason the University had neglected to furnish the promised speakers podium, so a last minute effort to locate one and get it brought to the dormitory.

With the institute about to begin we could not help but think of the great anticipation that the group showed, that many of them had traveled long distances to attend, that many had given their vacation time that they might enroll, that several had not only come to the Institute on their own time but had also paid either part or all of their expenses, and we could not help but think - after all this, the program had better be good.

With the Institute about to start and no one to change the records on Dr. Hullerman's Soundscriber we finally catch sight of a willing helper, and Paul Cole of Michael Reese Hospital, Chicago, offered to stay by the recording devise through all sessions to insure a complete transcription of all talks. Hope to have the Institute talks published in booklet form - but whether it is possible or not depends on a great many things - principally money.

July 16. . . . Today the program proceeds in earnest with several valuable and interesting talks on various aspects of hospital pharmacy. Although due back in New York City today, Dr. Fischelis graciously rearranged his work so that he would be able to carry on as planned as chairman of the evening's panel discussion. We were indeed happy to have Dr. Fischelis with us for in addition to adding the prestige and influence of the American Pharmaceutical Association to the Institute, he was also instrumental in arranging for many of the guest speakers and expertly handled his assignments on the program.

July 18. . . . After Wednesday evening's round table discussion at which there were so many questions that they could not be covered in the time allotted, the enrollees return for another full day of work to learn the latest on Streptomycin from Dr. Clifford Price and to gaze into the future of drug therapy with AMA's Dr. Austin Smith who has made a serious hobby of the manner in which the use of certain therapeutic agents have been carried across the American continent by the early settlers. We were most pleased that both Drs. Price and Smith stayed to participate in the evening round table discussion which, under the expert guidance of Evlyn Gray Scott (Silent Eve, someone said) lasted nearly until midnight - an achievement to keep 150 people in a room that long after an all day session.

NEWS ITEMS

JACK MORDELL ASSISTANT TO DR. ELLIOTT IN PHARMACY SURVEY

Assisting Dr. Edward C. Elliott in the recently inaugurated National Survey of Pharmacy is Jack Mordell, formerly chief pharmacist at Good Samaritan Hospital in Syracuse, New York. More recently he has served with the War Production Board.

LAUVE ACCEPTS NEW POSITION

Mr. Albert P. Lauve, formerly chief pharmacist at Charity Hospital, New Orleans has accepted the position as chief pharmacist at Mercy Hospital in New Orleans. Mr. Lauve is making plans for the pharmacy department for a new hospital to be constructed as soon as material is available. He hopes to make the pharmacy a model for smaller hospitals.

DR. FISCHELIS ADVISOR TO INTERNATIONAL HEALTH COUNCIL

Constitution for a world health organization was the objective of the International Health Conference held in New York City June 19 under United Nations Auspices. Serving as an advisor to the American delegation headed by Surgeon General Thomas Parran was Robert P. Fischelis, secretary of the American Pharmaceutical Association.

The object of the World Health Organization is to coordinate international efforts for the improvement of health service. Proposed functions of the organization include: promoting research in the health field; stimulating work to eradicate disease; assisting governments to strengthen their national health services and to provide aid in emergencies; and promoting international standards for pharmaceutical, biological and related products. To facilitate the exchange and diffusion of information it would foster improved standards of education in the health professions, develop central information services with respect to health and medical care, maintain an epidemiological and statistical service and assist in developing informed public opinion on matters of health. By cooperating with other agencies, it would also promote improvement of nutrition, working conditions, housing and other factors affecting environmental hygiene and sanitation. To facilitate international cooperation it would seek to establish conventions, agreements, and standardized nomenclature and would study administrative and social techniques in the health field.

"This is a splendid start, but the Commission of Experts was limited in its scope of activity since only about six nations participated in its work," Dr. Fischelis said. "The World Health Organization with 60 nations will undoubtedly enlarge the work considerably. The impression I gained in my contacts with delegates from various countries was that there was marked unanimity of opinion on health programs, regardless of any national political differences which might exist."

AMERICAN HOSPITAL ASSOCIATION CONVENTION IN PHILADELPHIA

Hospital Pharmacy will be represented at the annual convention of the American Hospital Association to be held in Philadelphia September 30 - October 3. An educational exhibit is being planned by the American Society of Hospital Pharmacists in cooperation with the American Pharmaceutical Association.

A Pharmacy Section held especially for the hospital administrators is being planned by the American Hospital Association. Serving as Chairman of this section will be John Zugich, chief pharmacist, New Haven Hospital, New Haven, Connecticut. The following program has been arranged for Thursday, October 3 at 2 o'clock P.M.:

"Planning the Hospital Pharmacy" by Leon N. Hickernell, assistant director, University Hospital, Augusta, Georgia.

"How Large Must A Hospital Be To Operate A Pharmacy?" by Claude R. Simpson, chief pharmacist, Seaside Memorial Hospital, Long Beach, California.

"The Standardized Hospital Formulary Is An Asset" by W. Arthur Purdum, chief pharmacist, Johns Hopkins Hospital, Baltimore.

"Pharmacy Service In The Medical Care of Veterans" by W. Paul Briggs, chief pharmacist, Veterans Administration, Washington.

A program designed for hospital pharmacists is being arranged for by the American Society of Hospital Pharmacists in cooperation with the Philadelphia Hospital Pharmacists Association. Mr. William Levin, chairman of the latter organization and chief pharmacist at the Philadelphia General Hospital, will be in charge of the program.

According to the tentative program developed by Mr. Levin there will be a dinner for hospital pharmacists Wednesday evening before the afternoon program. An afterdinner session featuring an open forum on the topics of the afternoon's lectures will be held. It is hoped that R. P. Fischelis, secretary of the American Pharmaceutical Association may be persuaded to participate in the evening session. The American Society of Hospital Pharmacists and the American Pharmaceutical Association are collaborating also in the arrangement of an educational exhibit at the American Hospital Association Convention. Hospital Pharmacists in the Philadelphia area who would like to make reservations for the dinner should call or write William Levin chief Pharmacist, Philadelphia General Hospital, 34th and Curie Avenue.

Note

Certificates for 1947 are now being printed. Those who have joined the Society recently and have not received a certificate will be sent a 1947 certificate as soon as they are ready. Those joining the Society and the American Pharmaceutical Association during the balance of the year will be paid through 1947.

VETERANS HOSPITAL PHARMACY REMODELED

New fixtures costing approximately $5,000 have been installed in the pharmacy at the Veterans' hospital in Alexandia, Louisiana where Albert H. Moore is in charge.

The pharmacy recently moved into new quarters on the ground floor of building No. 2, which is centrally located to make the service rendered easily accessible and to avoid delay in supplying wards and clinics with necessary medication, drugs, prescriptions, chemicals, intravenous solutions, alcohols and narcotics.

Only graduates of schools of pharmacy recognized by the American Association of Colleges of Pharmacy are employed on the pharmacy staff, which assures veterans who are patients in the hospital of the best pharmaceutical service obtainable.

There are at present three graduate registered experienced pharmacists on duty as follows: Albert Henry Moore, Loyola University, New Orleans graduate in charge; Anthony Gerard D'Antonio, Tulane University graduate, New Orleans, and David Francis Crowe, graduate of the University of Georgia. All three are veterans who saw service overseas in World War I or II.

DON FRANCKE ADDRESSES WISCONSIN PHARMACEUTICAL ASSOCIATION

"Trends In Hospital Pharmacy" was the subject of Mr. Don E. Francke speaking before the Wisconsin Pharmaceutical Association in Madison, August 20.

"If pharmacy in the future is to become strong, if it is to exert its influence on a national scale, all branches of the profession must cooperate to the fullest extent" Mr. Francke said.

Contrasting hospital pharmacy and retail pharmacy, he urged retail pharmacists to establish pharmacy service to the small hospital on at least a part time basis.

NEW MEMBERS

Edith Bactowsky
935 S. Goodman St.
Rochester 7, New York

Kenneth S. Bogart
Methodist Hospital
Indianapolis, Indiana

Frank H. Bowers
Hermann Hospital
Houston, Texas

Harry O. Burks
16 Village Green
Orange, New Jersey

Sister M. Verita Buss
St. Francis Hospital
La Crosse, Wisconsin

Wanda J. Butler
2719 E. 116th St.
Cleveland, Ohio

Sister M. Constantina
Wabash St.
Michigan City, Indiana

John Cygiel
Winter General Hospital
Topeka, Kansas

Clarence E. Daniel
Jewish Hospital
Louisville, Kentucky

Sister M. Eugenia
Loretto Rest
Syracuse, New York

Sister M. Laurissa-Felix
St. Joseph's Hospital
Milwaukee, Wisconsin

Edward Burns Geiger
Veterans Administration
Washington 25, D.C.

Isaac Gershenson
Syndenham Hospital
New York, New York

William E. Hassan, Jr.
394 Winter St.
Brockton, Massanhusetts

George D. Hawkey
St. Rita's Hospital
Lima, Ohio

Sister Eusebia Hehli
Sacred Heart Hospital
Eau Claire, Wisconsin

Sister M. Loyola Huslig
608 N. Fifth St.
Garden City, Kansas

Cora Jean Klein
Gill Hall Road, R. 1
Clairton, Pennsylvania

Sister M. Laurina Klein
1021 S. 6th St.
Terre Haute, Indiana

Conrad Philip Klingele
State Hospital
Wingdale, New York

Joseph Oscar Knoefel
Louisville General Hospital
Louisville, Kentucky

J. F. Kok
Zuidwal 60, The Hague
Holland

Sarah Krane
Illinois Central Hospital
Chicago, Illinois

Mercedes J. Kravetz
St. Margaret Memorial Hospital
Pittsburgh, Pennsylvania

Sister Vincent Kurtzeman
St. Vincent's Hospital
Birmingham, Alabama

Mabel Iris Lambach
Fitzsimmons General Hospital
Denver, Colorado

Joseph J. Laskarzewski
The Meriden Hospital
Meriden, Connecticut

Elizabeth M. Lynch
Wm. Booth Memorial Hospital
Covington, Kentucky

Sister Margaret Mary McCarthy
St. Mary's Hospital
Saginaw, Michigan

Norah M. McGwan
Royal Victoria Hospital
Montreal, Canada

Herman Milner
531 Pine St.
Philadelphia, Pennsylvania

J. A. Oliverio
452 W. Pike St.
Clarksburg, West Virginia

Clarence Edward Pierce
U.S. Veterans Hospital
Biloxi, Mississippi

Paul Potocki
Wilmington General Hospital
Wilmington, Delaware

Ruth E. Quanstrom
New England Baptist Hospital
Roxbury, Massachusetts

Charles P. Roe
412 N. 3rd St.
Oskalossa, Iowa

Marie Alice Roman
828 Bridge St.
Grand Rapids, Michigan

Evelyn L. Schwartz
439 Elm Ave.
Riverton, New Jersey

Sister Lydia Spain
2nd & D. St., S.E.,
Washington D. C.

Elizabeth Helen Sakal
804 Soles St.
McKeesport, Pennsylvania

William Slabodnick
Aultman Hospital
Canton, Ohio

Zelba Yant
313 McKinley Avenue
Pomona, California

Robert K. Schill
2314 Mountain Avenue
Scotch Plains, New Jersey

Gordon R. Smith
Hamilton General Hospital
Hamilton, Canada

Otto L. Zocklein
Morristown Memorial Hospital
Morristown, New Jersey

POSITIONS IN HOSPITAL PHARMACY

MERCY HOSPITAL, Davenport, Iowa wishes to hire a pharmacist. For further information write to Sister Mary Annunciata, R.S.M. Superintendent of Hospital.

WOODLAND CLINIC HOSPITAL, Woodland, California, is a 75-bed hospital with a clinic, which needs a pharmacist. The salary is $350 per month with a five and one-half day working week.

PRESBYTERIAN HOSPITAL, Charlotte, North Carolina is interested in hiring a pharmacist, preferably a woman. For further information write to J. P. Richardson, Superintendent.

PRINCETON HOSPITAL, Princeton, New Jersey, has a position open for a pharmacist who would also be in charge of the storeroom. About $200 will be paid as a starting salary to a suitable man. The Princeton Hospital is a 103-bed general hospital located approximately 15 miles out of Trenton, 16 miles out of New Brunswick, 45 miles out of New York and 43 miles out of Philadelphia. For additional information write to John W. Kauffman, Administrator.

The DUKE HOSPITAL PHARMACY has now been approved for on-the-job training for veterans. Excellent training is provided in hospital pharmacy administration, policy, and manufacturing. Pharmacists accepted will rotate through the sterile solution, general manufacturing, and hospital and out-patient clinic dispensing units. In addition to the salary supplied by the hospital, the veteran receives a supplementary allowance from the government which varies from $65 to $90 per month.

POSITIONS WANTED

Frank D. Dexter is a registered pharmacist in Texas and is interested in Hospital Pharmacy. He prefers a position in New Mexico or Colorado. Write Mr. Dexter at 1311 W. Craig, San Antonio, Texas.

Miss Zeeda E. Pomeranz, 3051 Odean Ave., Brooklyn, New York is interested in a position in Hospital Pharmacy. Miss Pomeranz has had several years experience in retail pharmacy.